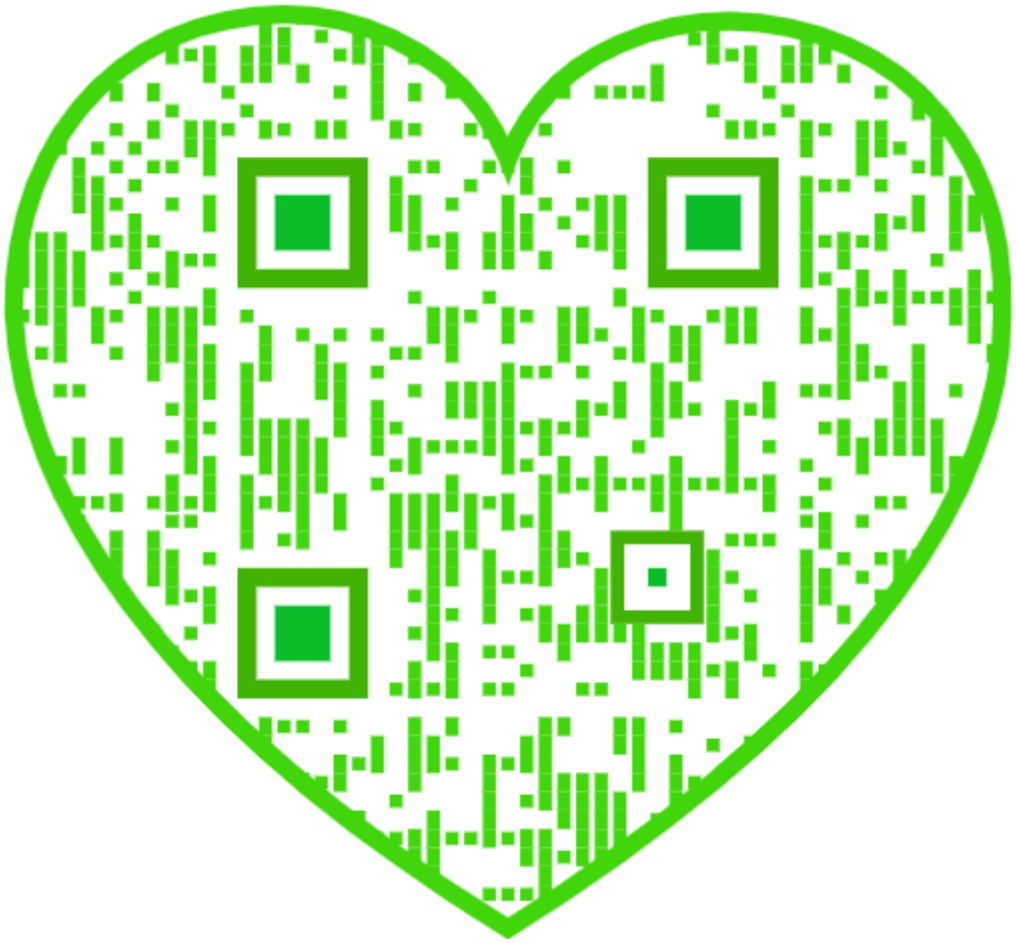

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A MANUAL

OF

FEVER NURSING

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A MANUAL

OF

FEVER NURSING

BY

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SECOND EDITION, REVISED

Illustrated

PHILADELPHIA
P. BLAKISTON'S SON & CO.
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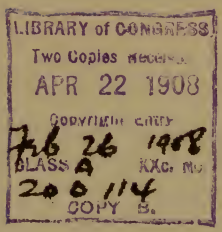

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Press of
The New Era Printing Company
Lancaster, Pa.

PREFACE.

This volume contains the lectures on Fever Nursing which were delivered in substance to the nurses of St. Mark's Hospital during the season of 1907–8. It is believed that the subject has been very completely and comprehensively treated, and in accordance with the present state of practice. The work of preparing the manuscript for the printer has been very conscientiously performed by Doctor Henry Hubbard Pelton and many practical suggestions have been made by Miss Annie M. Rykert, Superintendent of the Margaret Fahnestock Training School for Nurses of the Post-Graduate Hospital; to both of whom the author would extend his most appreciative acknowledgment.

New York City,
March, 1908.

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FEVER NURSING

CHAPTER I.

INTRODUCTION.

Definition of Fever: Causes: Physiology: Varieties: Lysis: Crisis: Recrudescence: Relapse: Normal and Abnormal Temperature: Symptoms.

Fever.—*Synonym,* Pyrexia. Fever, in the ordinary acceptance of the term, is understood to signify an abnormally high body temperature. In the present state of our knowledge, however, it must be considered as a group of symptoms caused by some derangement of the chemistry of the body which may be the result of a variety of causes. These causes may act from within, being generated in the body, or from without, having been introduced into the body. In either case they act by affecting the nervous system. For instance, fever may result from the failure of the body to throw off certain excrementitious products, as in cases of uræmic poisoning; from certain changes in the blood, as in cases of anæmia; from exposure to extremes of heat, as in sunstroke; from various intestinal disturbances; from mental abnormalities, as in hysteria. Most often, however, rises in temperature are due to the products of bacterial infection. The bacteria, as they grow in the body, throw off certain poi-

sonous substances which are taken up by the circulating blood and affect the nervous mechanism which controls body heat.

It is believed that in the central nervous system a centre or centres exist which control the heat production and the heat radiation (the two factors which regulate the temperature) of the body. Fever, therefore, is the result of the abnormal working of this nervous mechanism.

Heat production and heat radiation being responsible for the maintenance of a fairly constant body temperature, it follows that when variations from this temperature occur, they must be the result of abnormalities of these factors. Thus, fever may follow an increased heat production, a diminished heat radiation, or any other lack of proper ratio between the workings of these two functions. As a matter of fact, however, the most usual cause of fever is an increased production of body heat. Abnormalities of heat radiation are rare.

The word " fever " is incorporated in the designations of certain diseases of which, to the superficial observer at least, the chief manifestation is a rise in temperature. Of these diseases, which are sometimes spoken of as the essential fevers, typhoid fever may serve as an example. However, in these diseases, as in all others, the fever, that is, the high body temperature, is merely a part of the clinical picture, or in other words only a symptom.

Fevers are spoken of as *continued, intermittent* or

remittent. A *continued fever* is one in which the temperature maintains a continued high level with only slight variations. Typhoid fever may be taken as an example of this type. An *intermittent fever* is one marked by periods when the temperature may fall to normal, or even below this point, but only to rise again. Of this type ordinary malarial fever may serve as an example. A *remittent fever* is one characterized by a temperature continuously above the normal, and which falls and rises but is without intermissions. Remittent malarial fever may be considered as an example of this class.

Again, fevers are classified as *sthenic* (dynamic) and *asthenic* (adynamic). A sthenic fever is one characterized by a hot, dry skin, thirst, full, strong, rapid, tense pulse, high temperature, and perhaps active delirium. An asthenic fever is one in which the skin is cold and clammy, the pulse feeble, and the nervous system depressed.

In rare cases what is called an *inverse fever* occurs. In this type the elevation is highest in the morning and lowest in the evening, the opposite of the usual rule.

The return of an elevated temperature to normal is known as the defervescence. This may take place by a gradual fall with intermissions during which there is a rise, but not to so high a point as that at which the fall began, and, as a rule, each successive rise is less than its predecessor; a defervescence of this character is called a defervescence by *lysis.* At the termination of typhoid fever the temperature drops in this

manner. When a temperature falls to normal or below this point in the course of a few hours, the defervescence is spoken of as occurring by *crisis.* The usual defervescence in pneumonia is of this type.

After defervescence has taken place a rise of temperature lasting for only a short time sometimes happens; this is spoken of as a *recrudescence.* Such a circumstance is usually due to some insignificant and often unaccountable cause. When the fever and the other symptoms of the original disease return, it is evident that re-infection has taken place, and this manifestation is known as a *relapse.* To guard against the possibility of such occurrences, and in order that they may be immediately detected, it is wise to take the temperature at least once in the day, preferably in the evening, for a number of days after it has become normal.

The temperature of convalescent persons is much more easily affected than that of those in health. Errors in diet, constipation, too much muscular exertion, or mental excitement are often followed by rises of temperature in such cases. A rise of three degrees or more may signify the onset of some complication or a relapse, and, consequently, should immediately be reported to the attending physician. Sudden falls in temperature are likely to indicate collapse. In apoplexy and febrile diseases a considerable rise in temperature often takes place just before death, while in chronic wasting diseases the temperature may be subnormal for a number of hours before the end finally

takes place. The temperature of infants and young children is much more easily influenced than that of adults, and consequently in them even slight constitutional disturbances may cause a fever of considerable height.

The temperature is nearly the same in all parts of the body; which may be accounted for by the fact that all parts are supplied by the blood, one of the functions of which is the distribution of heat. The average temperature of the human body in health is 98.6° F. (37° C.), but any temperature from 97.5° F. (36.5° C.) to 99.5° F. (37.5° C.) is not considered abnormal, since body heat may be influenced by various factors even when disease is absent. The temperature of the body uninfluenced by disease may vary thus:

(*a*) With the time of day. It is usually highest from four to seven o'clock P. M. Its maximum is maintained for three or four hours, when a slow and gradual drop begins, lasting until from two to six o'clock A. M., at which time its minimum is reached; consequently at this time vitality is at its lowest ebb. As the morning progresses a gradual rise takes place until the normal 98.6° F. (37° C.) is reached. In persons who sleep by day and work at night the temperature is lowest in the evening and highest in the early morning.

(*b*) With the performance of the body functions. There is usually a slight elevation after a full meal, due to the active performance of digestion, and also during muscular exercise; though if at this time there

is profuse perspiration, there is, as a rule, a decrease in the temperature.

(*c*) With the part of the body used in measuring the temperature. These variations are slight and of no importance. Rectal or vaginal temperature is slightly higher than that of the mouth or axilla. The sensation imparted to the hand by the feel of the body is no guide to the height of the body temperature, though at times fever may be suspected and later proven by the use of the thermometer.

(*d*) With the age of the individual. In the infant it is slightly higher than in the adult and in old age it is a trifle lower, as the following table shows:

Normal temperature in the infant.. 99.5°F. (37.5°C.)
Normal temperature under 25 years. 99 °F. (37.2°C.)
Normal temperature about 40 years. 98.8°F. (37.1°C.)
Normal temperature in old age.... 98.6°F. (37 °C.)

(*e*) With the season of the year. The temperature of the body is very slightly higher in summer than in winter.

A temperature above or below the limits previously indicated signifies the existence of some abnormality of the functions of the body, and often the degree of the severity of this departure from the normal is in direct ratio to the height of the fever. The temperature may, however, descend as low as 77° F. (25° C.) or ascend as high as 108° F. (42.5° C.) without death resulting, but such extremes, when maintained for any considerable period of time, almost invariably terminate life. Extraordinary cases are on record of very

low and very high temperatures. After long exposure to severe cold a temperature of 75° F. (24° C.) has been noted, and yet the individual has recovered, and cases of sun-stroke have occurred in which the temperature has risen to 112° F. (44.5° C.) without causing death.

In hospitals patients are sometimes found who will cause the column of mercury in the thermometer to rise to very unusual heights. This is accomplished by shaking the instrument or by rubbing its bulb upon the bed clothing. Such patients are usually malingerers, and, if carefully watched, can be detected and prevented from practicing such deceptions.

In shock, after hæmorrhage, in certain forms of nervous disease, during marked alcoholic intoxication, especially if the individual has been exposed to cold and damp weather, and in any other condition producing a considerable weakening of vitality and a consequent condition of collapse, a subnormal temperature may exist.

The various ranges of body temperature may be classified thus:

Temperature of collapse.	95°– 97°F. (35 °–36.1°C.)
Subnormal temperature..	97°– 98°F. (36.1°–36.7°C.)
Normal temperature.....	98°– 99°F. (36.7°–37.2°C.)
Temperature of "feverishness"	99°–100°F. (37.2°–37.8°C.)
Slight fever.....	100°–101°F. (37.8°–38.4°C.)
Moderate fever.....	102°–103°F. (38.9°–39.5°C.)
High fever.....	104°–105°F. (40 °–40.5°C.)
Intense fever.....	105°–106°F. (40.5°–41.1°C.)
Hyperpyrexia.....	106°F. (41.1°C.) and above.

An elevation in body temperature is, as a rule, accompanied by certain symptoms referable to the various tissues and organs. Not all these symptoms show themselves in every case, they may not all be present in a selected case, but many of them are likely to be noticed in a patient who has any considerable rise in temperature. In certain diseases various of these symptoms may be particularly marked, and this fact often is of great aid in diagnosis. Instances in point are the conjunctivitis that usually accompanies measles and the sore throat that is a feature of the onset of scarlet fever. If the fever is caused by inflammation localized in any part of the body, there are usually manifestations which call the attention of both the patient and the observer to this part. For example, the pain in the chest, the cough, and the shortness of breath of pneumonia immediately suggest some interference with the proper action of the lungs.

Febrile diseases in the adult are usually ushered in by a distinct chill, with marked shivering, pallor, blueness of the lips, chattering of the teeth, and inability to keep warm, no matter how thickly covered, or by chilly feelings of greater or less severity. In the child it is often a convulsion, which may vary in intensity from slight muscular tremors of face and extremities to distressing movements of the entire body, which indicates the onset of fever. Following the initial chill or convulsion the rise in temperature, accompanied by other symptoms, appears.

The Symptoms of Fever.

Symptoms Referable to the Skin.—The skin is as a rule hot and dry and the patient complains that there is "fever" or that he "feels feverish," although it is quite possible for the temperature to rise to 102°–104° F. (38.9°–40° C.) without being noticed by the patient. At times, and more often in some diseases than in others, the skin may be damp with a cool perspiration. Various eruptions associated with the different eruptive fevers may appear. These will be described later.

Tiny vesicles (water blisters) may show themselves, often in great numbers, upon various parts of the body; these need cause no alarm since they indicate nothing worthy of notice. Delicate skins often show a general rosy blush which pressure with the finger-tip causes to disappear, but which immediately reappears upon removal of the pressure. This phenomenon is probably due to an increased quantity of blood in the cutaneous capillaries. In the late stages of fevers the outer layers of the skin are likely to scale off. Especially is this a feature of the eruptive diseases. At times large pieces of epidermis may be peeled off, notably after typhoid fever, when the skin of the fingers or toes may come away almost intact, forming veritable "moulds" of the parts.

Symptoms Referable to the Mucous Membranes.—The so-called "fever sore" (*herpes labialis*) is likely to be present, especially in malaria and pneumonia. There is, even early in fevers, thirst and a tendency to dryness of the mouth and tongue. The latter may be

of brighter pink than normal or coated with a grayish or whitish fur, swollen, and often showing indentations caused by the teeth. As the fever reaches its height the upper lip may be drawn back so as to show the teeth, and the tongue and lips become covered with a dirty, brown, foul, viscid deposit, consisting of food particles, cells from the lining of the mouth, mucus and bacteria, which is termed *sordes*. The lips may become fissured and the gums spongy and bleeding. At first the tongue may be coated only down its middle while its margin is redder than normal; as the disease progresses the tongue may tend to become dry at night while it remains moist by day. When the fever becomes very severe it may be difficult for the patient to extend the organ, and it becomes tremulous, brown, dry, crusted and cracked. Bleeding from the fissures readily takes place. As the patient recovers, the tongue gradually assumes its normal appearance, which process begins at the tip and extends progressively backward.

The pharynx is at first dry and may be the seat of a catarrhal inflammation; the tonsils and fauces may be swollen or ulcerated. The characteristic appearances of the throat in scarlet fever, diphtheria, etc., will be described in the sections devoted to those diseases. The salivary glands may be swollen and tender. The mucous membranes of the nose and eyes are likely to be congested and their secretions may be increased. There may be nose-bleed, especially early in typhoid fever.

Symptoms Referable to the Organs of Digestion.—The appetite is greatly diminished or entirely absent. The mere thought of food may be distasteful to the patient. At the onset of febrile disease nausea is common and vomiting often follows. Gas in the intestines is a less common symptom. It usually causes little discomfort and may not be worthy of notice except in typhoid fever, in which disease it frequently occurs and is the result chiefly of a paralysis of the muscular coat of the bowel caused by the general infection, rather than that of the presence and growth of the bacteria in the intestine. Usually in fevers the bowels are constipated. Diarrhœa formerly was considered a marked feature of typhoid fever, but constipation is frequently present.

Symptoms Referable to the Circulatory System.—The usual pulse of febrile disease is one of increased force and frequency and of greater resistance. As a rule the increase in these qualities is proportionate to the height of the temperature, as the following table shows, though in certain patients the acceleration may not be marked even with high fever.

Temperature of 98°F. (36.7°C.) corresponds to a pulse of 60
Temperature of 99°F. (37.2°C.) corresponds to a pulse of 70
Temperature of 100°F. (37.8°C.) corresponds to a pulse of 80
Temperature of 101°F. (38.4°C.) corresponds to a pulse of 90
Temperature of 102°F. (38.9°C.) corresponds to a pulse of 100
Temperature of 103°F. (39.5°C.) corresponds to a pulse of 110
Temperature of 104°F. (40 °C.) corresponds to a pulse of 120
Temperature of 105°F. (40.5°C.) corresponds to a pulse of 130
Temperature of 106°F. (41.1°C.) corresponds to a pulse of 140

In children the pulse is particularly susceptible to rise of temperature, rates of 150 to 190 per minute not being uncommon. In adults a rate of 110 to 130 is not infrequently observed, and it is often feeble; in extreme cases it may become so rapid and weak as to be uncountable and impart merely a sense of undulation to the finger—the so-called running pulse. A dicrotic pulse (one with a double beat), an intermittent pulse, or one irregular in force and frequency, is an indication of heart weakness. Any sudden increase in the rapidity or weakness of the pulse is likely to indicate the onset of some complication. Position, muscular action, and emotional excitement influence the strength and rapidity of the pulse to a considerable degree. Consequently in fevers the recumbent position should be insisted on, for conservation of the heart's strength may be a considerable factor in the preservation of the patient's life if the disease prove a protracted one.

Symptoms Referable to the Respiratory System. In fever the number of respirations per minute may be slightly increased, and the depth of the breathing diminished, even when no lung involvement is associated with the disease. There may be cough due to an accompanying bronchitis. When pulmonary involvement coexists, the respiration may be rapid, irregular and painful. In marked pulmonary disease the breathing may become very difficult or impossible when the patient is recumbent, and it may be necessary to allow him to sit up in bed with his back supported by a rest.

When cough exists it is often accompanied by expectoration, the character of which will be described in the sections devoted to the febrile pulmonary diseases. Specimens of this should be retained for examination by the physician.

Symptoms Referable to the Urinary System.—The urine of a beginning fever is less in quality than in health, of higher specific gravity, of darker color, and occasionally turbid. It may cause a burning sensation on being passed, due to its increased acidity. As the disease progresses toward recovery the quantity increases and the urine becomes more nearly normal in other respects. In convalescence the quantity may be even greater than in health. Fever urine, on standing, often deposits a red or reddish-brown sediment, consisting usually of uric acid or urates, which are the products of the unusual tissue changes which take place during febrile conditions. In severe febrile disease albumin, casts and even blood may appear; these, however, do not of necessity indicate permanent impairment of the kidneys. Retention of urine is a rare concomitant of fever.

Symptoms Referable to the Nervous System.—The initial chill or convulsion of fever has been discussed above (p. 8). When a chill manifests itself in the course of a fever it is likely to signify a sudden alteration for the worse in the patient's condition or the onset of a complication. Consequently such an event should be immediately reported to the attending physician. The convulsion of beginning fever, as a rule, is

not the result of any change in the nervous system, but is caused by the poison of the disease. Convulsions developing later in febrile disease not involving the nervous system are rare, and may be due either to hysteria or to the presence in the system of substances which should have been eliminated through the kidneys. Urinary examination may throw light upon the causation of such convulsions; hence it is important that the nurse should secure a specimen at the earliest opportunity.

Headache is one of the most frequent symptoms of the onset of fever. It may vary from a dull ache of slight character to an intense, persistent and almost unendurable pain. At times it may be of neuralgic type. The pain is usually in the forehead or temples; more rarely it occurs in the top or back of the head. As the disease progresses it is likely to abate in violence.

Pains in the back and limbs and in the bones are often associated with the headache, and also may vary in intensity from a mere discomfort to the severe pain in the back associated with smallpox or the marked bone-ache of epidemic influenza.

Dizziness or vertigo often exists during the inception of febrile disease. This is increased when the patient stands and is much relieved by the recumbent position. Patients recovering from fevers of protracted length are frequently subject to dizziness due to weakness.

Mental symptoms are very common manifestations during fevers. These vary from mere dulness, listlessness, apathy and indisposition to mental exertion to extremes of delirium, or even absolute coma. These symptoms differ with the temperament of the individual; intellectual persons and those who, in their daily occupations, are accustomed to use the mental rather than the physical faculties, are most likely to suffer from disturbances of this character. Naturally the type and severity of the disease influence to a marked extent the degree of mental disturbance. Extremes of mental disorder generally manifest themselves when the disease is otherwise at its worst.

Delirium is not unusual in severe fevers and may, though rarely, exist from the onset of the disease. More commonly it occurs later and varies in degree; it may be mild and appear only at night; it may be of quiet type or very violent, noisy, and so marked that restraint is necessary to control the patient. In other cases the delirium may be of the low, muttering type. When this occurs the patient lies quietly with his eyes open or closed, in a sort of half-waking state; he mutters incoherently to himself in a low tone, taking no cognizance of what is happening about him, and perhaps picks at the bed clothing or grasps at imaginary objects. He will respond sluggishly to a loud question and to active sensory impressions (a pinch or pin prick). He may make short replies, but soon relapses into his stupor, which may be troubled by dream-like hallucinations. These may disturb him even while

he is in a half-waking condition. While in this state restraint is unnecessary, but the nurse's vigilance must not for an instant be relaxed, for at any moment aggressive delirium of alarming character may appear. Habitual users of alcohol are likely, especially during the fever of pneumonia, to develop delirium tremens. Delirium of this type may attack even those who are unaccustomed to alcohol. Under this condition the patient talks constantly and incoherently. He is in motion continuously, there is marked muscular tremor, and he is unable to sleep; he often shouts aloud, and frequently desires to rise, go out and attend to his work; visual and auditory hallucinations develop, and he may see various imaginary objects, especially animals, such as rats, snakes or insects, particularly those which are disagreeable, and think that they are creeping about the bed.

Delirium may pass on into stupor, a condition in which the patient lies quietly in a partially unconscious state, from which he may be aroused with some difficulty, but into which he slips again when the attempt to awaken him is discontinued; or a condition termed *coma vigil* may result. This is an unconscious state in which the patient lies with eyes open, but entirely oblivious to all going on about him; he neither realizes nor can he express his desires, he mutters constantly, his lips and tongue tremble, and there are twitchings of his fingers and wrists (*subsultus tendinum*), due to the convulsive jerkings of their tendons; he picks at the bed clothing and grasps at invisible objects. Such con-

ditions as these may gradually disappear as the patient progresses toward recovery, or absolute coma may supervene. This is a condition of entire insensibility, from which it is impossible to rouse him; he lies practically motionless, is unable to swallow, and passes fæces and urine involuntarily. Such a state is usually, although not invariably, a precursor of death.

Hiccough (*singultus*) is at times an obstinate symptom of fever. It is occasioned by a spasmodic contraction of the muscles of the diaphragm and may continue, despite energetic treatment, for considerable periods of time.

Symptoms Referable to the Special Senses.—*Taste.*—In fever the sense of taste is rendered less acute, perverted, or, exceptionally, wholly lost. Nothing tastes good, thirst in increased, water is always acceptable, and sour-tasting foods and drinks are preferred to sweet.

Smell.—The sense of smell is frequently blunted, owing to the catarrhal inflammation of the nasal mucous membrane which may accompany fever. Especially in typhoid fever, as mentioned, nose-bleed may be an early symptom.

Hearing.—Hearing may be impaired, but is more usually rendered abnormally acute; there are often noises and ringing in the ears. Deafness is exceptional. The infectious fevers may be complicated by inflammations of the middle ear. In such cases there is earache, which is lessened if the inflammation goes on to perforation of the drum-membrane. When this

takes place a discharge usually appears. At first this is thin, yellowish and perhaps bloody; later it becomes thicker in consistency and often foul.

Sight.—There is often a dread of bright light (*photophobia*), and vision is less acute than normal. Usually early in fevers the pupils are dilated; later there is no fixed rule for their condition. Frequently the lining of the lids is inflamed; its secretion is at first increased but later diminished, causing dryness. At times the lids may be gummed together.

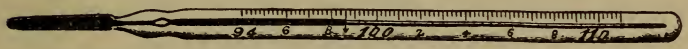
Fever is always accompanied by an increase of tissue waste; consequently emaciation to a greater or less degree is an inevitable result. This is all the more marked since, in addition to the tissue waste, there is disinclination on the part of the patient to eat and probably inability on the part of the digestive and assimilative powers to supply the increased need of bodily nourishment.

CHAPTER II.

DIAGNOSIS: THERMOMETRY.

The Thermometer: Scales of Thermometry: The Taking of Temperatures: The Pulse: The Respiration: Temperature Charts.

Diagnosis of Fever.—Fever being defined as an abnormal degree of body heat, the determination of its presence is made by measuring the temperature of the body. It is customary as well to note, at the same time, the number per minute and character of the pulse beats and respirations. The height of the temperature is measured by means of the clinical thermometer.



CLINICAL THERMOMETER.

This little instrument is a form of maximum thermometer; that is to say, an instrument so constructed that when its column of mercury reaches a certain height it remains there until displaced by jarring or shaking. The object of this is to give the observer sufficient time for accurate reading. Some clinical thermometers are provided with a curved surface which magnifies the column of mercury so that it is more easily read than in instruments not so constructed. Thermometers registering in one minute or less may be purchased, but in hospitals those requiring from

two to five minutes are usually employed, since they are less expensive.

There are in use at the present time three scales of thermometry, the *Fahrenheit,* the *Centigrade* and the *Réaumur.* The differences in these are as follows: while all are based upon the freezing and boiling points of water, the Fahrenheit scale takes 32° as the former and 212° as the latter, the Centigrade scale, 0° and 100°, and the Réaumur scale, 0° and 80°. A table of comparisons of these scales is appended.

Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.
116	46.7	37.3	86	30	24
114	45.6	36.4	84	28.9	23.1
112	44.4	35.6	82	27.8	22.2
110	43.3	34.7	80	26.7	21.3
108	42.2	33.8	78	25.6	20.4
106	41.1	32.9	76	24.4	19.6
104	40.	32	74	23.3	18.7
102	38.9	31.1	72	22.2	17.8
100	37.8	30.2	70	21.1	16.9
98	36.7	29.3	68	20	15
96	35.6	28.4	66	18.9	15.1
94	34.4	27.6	64	17.8	14.2
92	33.3	26.7	62	16.7	13.3
90	32.2	25.8	60	15.6	12.4
88	31.1	24.9			

Only the first two scales are in common use, the Fahrenheit in America and England, the Centigrade upon the continent of Europe; however, many physicians in the United State prefer to use the latter scale. Certain rules may be formulated for the conversion of one scale into the other; for instance, to convert a Fahrenheit reading into a Centigrade, one subtracts 32,

multiplies by 5, and divides by 9. To reduce a Centigrade into a Fahrenheit, one multiplies by 9, divides by 5, and adds 32. Examples:

$$98.6° \text{ F.} = (98.6 - 32 \times 5 \div 9) = 37.0° \text{ C.}$$
$$37° \text{ C.} = (37 \times 9 \div 5 + 32) = 98.6° \text{ F.}$$

In the text of this volume the Fahrenheit scale will be used, with the Centigrade equivalent following in parentheses.

The index upon a clinical thermometer usually reads from 95° F. (35° C.) to 110° F. (43.3° C.) or 112 ° F. (44.4° C.), and each degree is divided into fifths, so that one accustomed to the use of the instrument may easily read as closely as to the tenth of a degree.

With use the accuracy of clinical thermometers becomes somewhat impaired, owing to the action of differences in temperature upon the glass; consequently it is wise from time to time to have them compared with a standard instrument. This may be done by holding both thermometers in a vessel of warm water and noting the difference in registration if any exist.

In private practice each nurse should be supplied with two thermometers, to provide against breakage; it is wise to keep one of these for mouth and the other for rectal temperatures. In hospitals, especially in contagious disease wards, there should be a thermometer for each patient, and the nurses should take great care not to break the instruments, as in a large institution the cost of the thermometer supply is by no means a small item. When not in use they should be

kept in a small vessel, a tumbler for example, filled with an antiseptic solution (5 per cent. phenol (carbolic acid) or 1 to 5000 mercury bichloride). The bottom of the vessel should be covered with a layer of absorbent cotton. Recently it has become possible to purchase thermometers in air-tight cases which may be filled with an antiseptic solution. The appliance is one to be recommended to those who carry the instrument in bag or pocket.

The temperature may be measured in the mouth, the axilla, the groin, the rectum, or the vagina. In ordinary practice the mouth or axilla is usually used. The temperature varies within small limits dependent upon the situation employed, as the following table indicates:

Axilla (groin)	98.4°F. (36.9°C.)
Mouth	98.6°F. (37 °C.)
Rectum (vagina)	99.5°F. (37.5°C.)

Before and after taking the temperature in any of these situations the thermometer should be washed in clean *cold* water, and the column of mercury shaken down as low as 95° F. (35° C.). If the mouth is to be used, the nurse should make sure that no hot or cold substance has been eaten or drunk for some time previously. The patient should be told to keep the instrument upon the floor of the mouth, underneath the tongue, to hold the lips tightly closed, lest outside air enter, and to breathe gently through the nose. If the thermometer is broken in the mouth and pieces are

swallowed, the physician should be notified immediately, although no bad results are likely to ensue.

In using the axilla, the part should be wiped with a moist sponge or cloth, and then thoroughly dried with a towel. The bulb of the instrument should be placed in the deepest part of the arm-pit, the arm pressed close to the side, and the forearm folded across the chest with the hand upon the opposite shoulder. The nurse must hold the arm in this position while the thermometer is in place.

When taking the temperature in the rectum, care should be taken that the bowel is empty, for if the thermometer does not come in direct contact with the mucous membrane it will not register the correct body temperature. The instrument should be lubricated with vaseline, or other like substance, and the buttocks gently separated with the fingers of one hand, while the bulb of the thermometer is inserted through the anal opening for from one-and-a-half to two inches. In struggling children and in delirious patients the nurse must take great care lest the instrument be broken within the bowel. When taking the rectal temperature of a restless child a safe method is to place the child with face downward over the knee and point the thermometer toward the umbilicus. Never leave a child while the rectal thermometer is inserted. In taking the temperature in the vagina the technique is practically the same as when the rectum is used.

Taking the temperature in the groin is seldom necessary, and the results obtained there are less accurate than in any of the other situations.

It is wise to allow the thermometer to remain in place at least five minutes, so as to be certain of accurate registration. When there is local inflammation in or near the axilla, the mouth or the rectum, the local heat is increased over that of the rest of the body; consequently in such case an unaffected part should be used in measuring the temperature.

In every febrile condition the temperature should be taken at least twice during the twenty-four hours. Since the temperatures of the morning and evening indicate most exactly the progress and severity of the disease, these are the most appropriate times. In diseases of severe type it is customary for the physician to order the temperature taken every six, four or three hours, as he may deem necessary. Usually it is unwise to waken a patient in order to take his temperature, for the benefit derived from the sleep is likely to exceed that accruing from learning his temperature; but at times it may become necessary to take the temperature at the stated intervals at all hazards. Decision upon this point is, of course, left with the physician.

The Pulse.—In taking the pulse two factors must be considered, first, its frequency; second, its quality.

The frequency of the pulse is affected by the same influences which affect the temperature (see p. 11). It also differs in different individuals under the same conditions. One person in health may have a pulse as slow as 50 to 60 beats to the minute, while another's may beat 80 to 90. Age and sex influence the pulse-rate, as the following table shows:

Normal pulse in children...	90–100 beats per minute
Normal pulse in adult males.	60– 75 beats per minute
Normal pulse in adult females	65– 80 beats per minute

In noticing the quality of the pulse the following points must be considered:

(*a*) Regularity or irregularity.

(*b*) Whether intermittency be present.

(*c*) The size of the artery.

(*d*) The character of the pulse wave.

1. Whether the rise be quick or slow.
2. Whether the fall be quick or slow.
3. Whether dicrotism be present.

(*e*) The tension of the artery wall.

(*f*) Whether the artery wall be abnormally thick.

A pulse may be irregular in frequency, in force, or in both these elements. An intermittent pulse is one which drops a beat at regular or irregular intervals.

The pulse wave as it is felt by the finger of the observer may rise and fall with varying degrees of rapidity. A dicrotic pulse is one in which two distinct beats are felt for each pulsation of the heart. The first and greater of these is the true pulse beat, and care should be exercised on the part of the nurse not to count the second and weaker pulse. In cases where it is difficult to distinguish the true beat from the false one the hand should be placed on the chest over the heart's apex. When this is done the dicrotic pulse may be counted with ease and correctness. In this type of pulse, which occurs only when arterial tension

is low, the second wave is due not to a contraction of the heart, but to the closure of the aortic valves.

The tension of the artery wall depends upon two factors: Whether the muscular coat of the artery be contracted and whether the vessel be fully distended with blood. A pulse of high tension is not easily compressible by the finger and its condition is analogous to that of a rubber tube well filled with water under heavy pressure.

Thickening of the artery wall is determined by pressing the vessel, in order to empty it of blood, and then trying to roll it under the finger-tips. If the empty vessel is more than slightly perceptible, its wall may be considered as thickened. Thickness differs in degree from bare perceptibility to such marked thickening that the vessel feels like a pipe-stem under the skin.

The normal pulse is perfectly regular in force and frequency with an artery of medium size, whose rise and fall are gradual, whose tension is only moderate, and whose wall is not thickened.

Under normal conditions some individuals have an intermittent pulse, but such a condition is not a frequent occurrence.

Impairment of the strength of the pulse, increase in its rapidity, intermittency and dicrotism, are indications of heart-weakness, and are not unusual manifestations in febrile disease.

The nurse should be watchful of the effects upon the pulse of various therapeutic measures, such as baths and the different drugs. In disease, pulse and tem-

perature bear an important relation to one another, pulse frequency being increased as a rise in temperature takes place; any disturbance of this ratio should be carefully noted by the attendant, since it may be an indication of heart weakness.

In taking the pulse the radial artery in the wrist is the usual site for the procedure, although at times the carotid or temporal arteries may be found more convenient. The nurse should accustom herself always to use the same fingers, usually the index and middle fingers of the right hand, because continued practice will result in extreme delicacy of touch. The pulse should be counted for at least one minute in order to insure accuracy.

The Respiration.—In taking the respiration of a fever patient, as in taking the pulse, frequency and character are the elements to be noted. Normally the number of respirations per minute in the adult is in the neighborhood of eighteen, or one to about every four pulse-beats. The rapidity of respiration varies, as does that of the pulse, at different periods of life.

Respirations in the infant..... 30–35 per minute
Respirations in the child from five to eight years..... 20–25 per minute
Respirations after eight years of age..... 18–20 per minute

The normal pulse-respiration ratio may be modified in disease. In fevers without lung involvement the pulse usually undergoes a greater relative increase than the respirations, while in cases in which the lungs are

affected the reverse of this rule is the usual condition.

In observing the respirations the following characteristics should be noted:

(*a*) Their frequency.

(*b*) Their regularity.

(*c*) Their depth.

(*d*) Whether they be quiet or stertorous.

(*e*) Whether they be abdominal or thoracic.

Stertorous respiration is breathing accompanied by a sound resembling snoring.

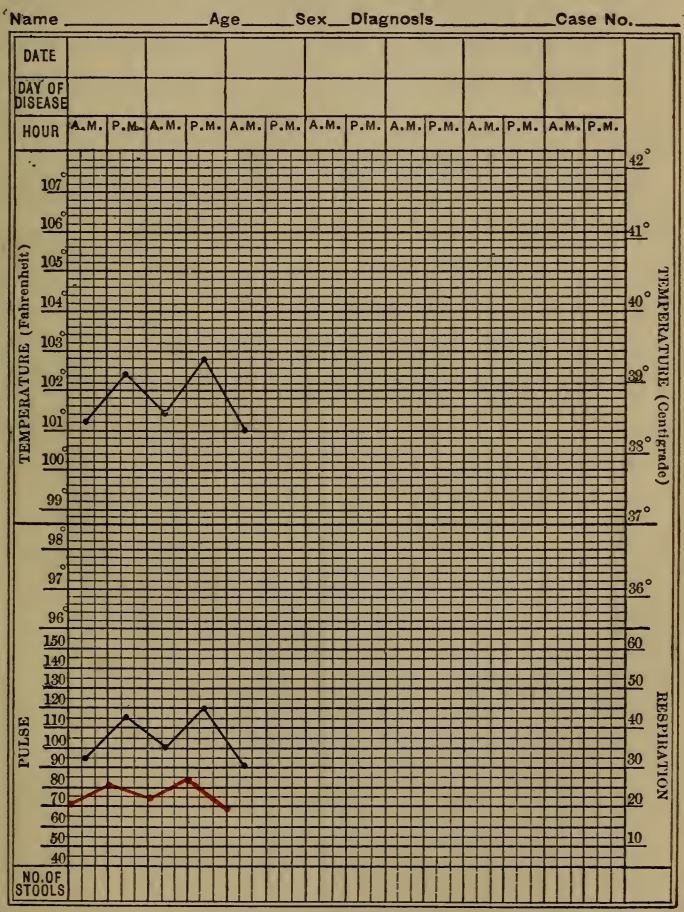
In children and adult males respiration is normally abdominal, that is to say the abdomen, rather than the chest, rises and falls upon inspiration and expiration; while in adult females thoracic respiration—breathing in which chest movement is more marked—is the rule.

While taking the respiration the nurse should not allow the patient to know what is being done, for this knowledge is likely to have such a mental effect as to influence the depth and rapidity of the breathing. Usually the respiration can be counted by watching the rise and fall of the chest or abdomen of the patient without his cognizance. In order to insure an accurate record the respirations should be counted for at least one minute.

In children the act of crying frequently renders it quite impossible to estimate the respirations with any degree of accuracy.

For recording the temperature, pulse and respiration printed or ruled charts are used which not only show at a glance the course of the disease in regard to these

factors, but are valuable afterwards as documents of reference. Such a chart is depicted below. The method of recording the temperature, pulse and respiration is



as follows: Suppose the patient is first observed in the morning and his temperature is 101.2° F. (38.5° C.),

his pulse 95 beats per minute, and his repirations 20 per minute; dots are made upon the chart in the proper places. In the evening his temperature is found to be 102.4° F. (39.1° C.), his pulse 115, and his respirations 25; dots are again made in the column for afternoon records, and lines are drawn connecting these

Examination of Urine		Medication	Diet	General Remarks
Oz.	Remarks			

with those of the morning. The next day the process is repeated, and so on during the period of illness. When the records are taken more often, the method is the same, the chart being so arranged as to make the recording of the patient's condition every four hours very simple. Upon the right side of the chart will be found Centigrade and respiration scales. It is well to chart the night temperature curve and the respiration curve in red ink. The spaces for date, day of disease, and number of stools will explain themselves.

Upon the back of the chart (*see* opposite page) will be found spaces for recording the urinary examinations, the medication, the diet, etc. It is suggested that the notes for the night be made in red ink.

CHAPTER III.

GENERAL TREATMENT: DIET.

Hydrotherapy: Treatment of Special Symptoms: Feeding: Beverages: Diet in Convalescence: Diet-list.

General Treatment of Fever.—At the first indication of febrile disease the patient should be put to bed, in the recumbent position, and strict quiet enjoined. The problems that confront us in the management of such a patient are two: first the removal of the cause and underlying factors so far as this is possible, and, second, the restoration of proper metabolism, the abnormal condition of which is shown by the various derangements of the bodily functions which are a part of the clinical picture.

Frequently very little can be done to remove the cause of a fever, as this is self-limiting and its results impossible of abortion or shortening; still, unless there exist some contraïndication, we may be able to lessen the effects of this cause by inducing elimination through various channels. This may be done by causing emesis and free movements of the bowels, increasing the quantity of urine, and stimulating the action of the skin so as to induce free sweating, or by rectal irrigation. The poison circulating in the blood may be rendered less harmful by the introduction of warm salt solution (0.7%) under the skin or

directly into the blood stream through an opening into a vein.

By emesis irritating substances will be removed from the stomach, and further infection by this route prevented, and the absorption of poisons through the stomach wall will be stopped. Free purgation will act in like manner upon the intestinal tract and also perhaps aid in removing toxic substances from the blood. The induction of increased action of the skin and kidneys leads to a like effect, and the high rectal irrigations and the injection of salt solution under the skin, or directly into the circulation, not only dilute the poisons, but tend to hasten their elimination through the various channels and act as stimulants of considerable power upon the weakened system.

By these means we may in exceptional instances remove the primary cause of the disease; when this is impossible we may lessen the severity of the process and accomplish much toward the restoration of normal metabolism and the correction of the disturbed body functions.

In the less severe febrile diseases the abnormal temperature, which may run from 101° F. (38.3° C.) in the morning to 103° F. (39.4° C.) in the afternoon, needs no special attention. When high temperature persists and is of itself manifestly a menace to the patient, measures must be taken to mitigate it. This may be done:

(*a*) By drugs. The various so-called antipyretics, acetphenetidin (phenacetin), acetanilide, antipyrine,

etc., may be employed, but their use may be attended by bad effects, especially upon the heart, and their administration for this purpose is fast passing out of vogue. Patients to whom these drugs are given must be carefully watched by the nurse for signs of heart-weakness. The fall of temperature following their use may be accompanied by various signs of prostration which will necessitate warm covering, the use of hot-water bottles, and perhaps the administration of whiskey, aromatic spirit of ammonia, or other stimulant. Consequently the reduction of fever by drugging is to be attempted with the greatest care, if at all.

(*b*) Much more advisable is the control of high temperature by means of cold applied externally. This may be done in various ways as follows:

1. *The Cool Tub Bath.*—To give this bath it is necessary to have two, or, if possible, three attendants. Have ready the following articles: a portable tub, a large rubber sheet, two rubber aprons, one large sheet, one draw sheet, a T binder or triangular bandage, a bath thermometer, a dish containing ice, a large pitcher filled with very hot water, a rubber cap to cover the patient's hair, non-absorbent cotton for the ears, two or more hot-water bottles with two covers for each bottle, a foot-tub for the soiled or wet linen, a strip of canvas or an air cushion to support the patient's head while in the tub, two compresses for the head, towels, a rectal thermometer, vaseline, safety pins, a bottle of whiskey, a medicine glass and drink-

ing tube, a clock or watch placed on the table, mouth swabs and mouth wash, a pus-basin containing disinfectant, and a glass for hot milk, which should be heating while the bath is being given.

Place everthing in the most convenient place. Wheel the tub, which has been half filled with water at a temperature of 85° F. (29.4° C.), or other proper temperature, to the patient's bedside. If the water is too hot, add pieces of ice wrapped in gauze; if too cold, add some of the hot water. Give whiskey (if ordered). The nurses should then roll up their sleeves to above the elbows, put on the rubber aprons, and proceed as follows:* Cover the patient's hair with the rubber cap, fill her ears with the cotton, and pin the triangular bandage or T binder around the abdomen and buttocks. Remove the pillow, and slip the draw sheet under the bed clothes over the patient, plait the bedding to the foot of the bed, remove the night gown and hang it over the bed-post, draw the patient to the edge of the bed near the tub, and put the cold compresses on her head. Lift the patient gently, instructing her to hold herself stiff. One person takes the head and shoulders, with the head resting on her (the nurse's) arm, another, the feet, and the third, reaching across the tub, passes her hands under the buttocks, at the same time keeping the draw sheet from touching the water. Begin rubbing the patient when she reaches the water, com-

*The directions here given apply to the bath for female patients, as in their case special care must be taken that the hair does not get wet. With this exception the bath for male patients is conducted in precisely the same way.

mencing with the spine and extremities, and avoiding the abdomen. Change the ice compresses frequently, watch the pulse and color of the skin. The bath lasts from ten to fifteen minutes as ordered, and fresh water is used for every bath.

Prepare the bed for the reception of the patient in the following manner: Have the third person cover the entire bed with the rubber sheet, fold the large cotton sheet lengthwise across the bed, and place the hot-water bottles at the foot, under the rubber sheet. Throw the draw sheet over the tub, then remove the binder, rubber cap, and cotton from the ears. Lift the patient gently into the large sheet on the bed, dry her by rubbing over the sheet, place the hot-water bottles to the feet, remove the wet sheets and rubber by rolling the patient from one side to the other, and at the same time pull up the dry bed clothes, which have been folded at the foot of the bed. Replace the night gown, fold a towel under the patient's chin, wash mouth, tongue and teeth with mouth-wash, and give hot milk to drink. Place the rubber sheet and the wet and soiled linen in the foot tub, ready to be disinfected and hung up to dry, so that they may be used when the next tub is given.

If the patient shows signs of poor reaction while in the bath, such as blueness of the lips and extremities or decided shivering, or if the effect upon the heart is untoward, the duration of the bath should be lessened. In most patients chattering of the teeth may be disregarded, and cyanosis of the extremities

alone need not be considered sufficient reason for stopping the bath; but if marked blueness of the face, especially about the nose, is noticed, the patient should be immediately taken from the water. The patient's temperature is useful as an indication of the effect and for the necessity of a repetition of the procedure. It is a great mistake to endeavor to lower the pyrexia as much as possible. Before the patient is put into the bath, and after removal from it, it is usual to administer a glass of wine, a half-ounce of whiskey, a half to one drachm of the aromatic spirit of ammonia, diluted, or a small cup of hot milk or coffee, as the physician may direct. During the bath a glass of cold water may be allowed.

The patient's powers of reaction may be measured by a tentative bath lasting five minutes at 90°, reduced to 80° F. (32°–27° C.), and the initial temperature, the reduction, and the length of the following bath may be determined accordingly. If possible, the physician should be present during the bath, both to guard against the possibility of shock and to make sure that the good effects of the procedure are not lessened by too early termination of the bath.

If the cold tub is not well borne by the patient, luke-warm baths, given in the same manner, are often followed by good results. The procedure may bring about a drop in temperature of from one to four degrees (F.), but it is wise not to allow a reduction of more than two degrees (F.) (one degree C.).

In private practice an ordinary tin bath-tub from

five to six feet long, which may be purchased at the plumber's, is convenient. The stationary bath-tub, for obvious reasons, should never be used. In hospitals portable tubs are usually provided.

The preparation of the bed for the reception of the patient is of the utmost importance. All should be ready before the beginning of the procedure, so that there may be no delay if it becomes necessary to terminate the bath sooner than was expected. The lowering of the temperature is not the only good effect produced by this measure; it is also believed to be a stimulant to the nervous and circulatory systems.

2. *The Bed or Slush Bath.*—This is a less severe method than the tub bath, and many patients to whom the cold bath is almost unendurable bear it well and are very favorably affected by it. It is given upon a bed upon which has been placed, under the patient and over the pillows, a large rubber sheet, reaching almost to the floor at the foot of the bed, and covered with a muslin draw sheet. Blankets rolled lengthwise are placed under the rubber sheet on each side, close to the patient, meeting at the feet. The pillows form the upper end of the trough. Several pails of water are poured into this trough and kept cooled to the proper temperature by pieces of ice wrapped in gauze. The patient is treated just as when the tub bath is employed. When the bath has been given the water is drawn off by raising the head of the bed, separating the rolls of blankets at the feet, and allowing the water to run into a tub, which has been placed on the floor at the

foot of the bed. A dry sheet is thrown over the patient and the rolls of blankets are removed. The patient is dried and the wet rubber and sheets removed in the same manner as when the tub bath is given. The after-treatment is the same. The bed bath may be constructed also by passing a piece of clothes-line around the head and foot of the bed, connecting these by two parallel ropes, and throwing over the whole an oil cloth which is attached to the rope by clothes-pins; or a rectangular fence about eight inches in height and slightly smaller than the mattress may be constructed, over which a rubber sheet may be thrown. The water from these improvised tubs may be drawn off by a siphon made of a few feet of rubber hose.

3. *The Sponge Bath.*—For this measure the water may be of various temperatures, as indicated; often the addition to it of a little alcohol is very grateful to the patient. For the sponge bath the following articles will be required: two head compresses in a glass dish of ice water, two large compresses for the chest and abdomen, two large compresses for sponging, a large rubber to cover the entire bed, two foot-tubs and ice, one draw sheet, one large sheet, hot-water bags with covers, alcohol (50%), thermometer, whiskey and hot milk (if ordered). Plait the large rubber and large sheet together, slip the draw sheet under the bed clothes, covering the patient, and fold the bed clothes at the foot of the bed. Remove the night-garment, roll the patient on the right side, and lay the folded rubber and large sheet on the bed, close to

him. Turn the patient over and draw the sheets smooth under him. Place cold compresses on the head, chest and abdomen. Bathe the face with ice water, and sponge the arms and legs for two minutes each, the chest for two minutes, and the back for five minutes. In sponging the arm the sponge is carried down along its inner surface to the hand; after which the sponge is turned over and passed up on the outside of the arm. Change the compress after each stroking. Sponge the leg from the groin to the ankle and up along the outside. Change the compresses on the head, chest and abdomen every three minutes. Roll the patient on his side and bathe the back for five minutes. Dry the back with the sheet and roll the wet sheet of rubber close to the patient's back. Remove the compresses and roll the patient over on his other side, on the dry bed. Remove the wet clothes and rubber, and put them in a foot-tub. Draw up the bed clothes and apply the hot-water bottles to the patient's feet. Replace the night-dress, wash the mouth, and give a hot drink. The same sheets and compresses may be dried for the next treatment. Care must be taken to keep the portions of the body which are not being sponged covered. Particular attention should be given the back, for here the tissues retain the heat longest. Proper reaction is evidenced by redness of the skin. No such effect is produced upon the temperature by sponging as by tubbing; nevertheless the fever may be slightly lowered. The chief good accomplished is its favorable action upon the skin and the great comfort which it affords the patient.

4. *The Sprinkle Bath.*—As a method for the reduction of temperature this may be considered as rivalling the tub bath. It has the advantage of being better borne by many patients and of peculiar adaptation to private practice. The technique is as follows: The head of the bed should be raised about ten inches from the floor, and, to keep the mattress from sagging, under it should be placed crosswise several pine boards as long as the width of the bed. The mattress should be covered with a rubber sheet, under which rolls of blankets have been placed to form a trough. The patient should be stripped and sprinkled with water of the desired temperature from an ordinary watering-pot or from an irrigating apparatus to the tube of which a sprinkling-nozzle is attached. The water, as it flows from the foot of the bed, should be received in a large dish-pan or foot-bath, and can be used over and over; the proper temperature being maintained by the addition of ice. The water should not be poured from too great a height, and should be applied chiefly to the abdomen and legs. Rubbing with the hands should be kept up throughout the procedure, and otherwise the patient should be dealt with exactly as in tub bathing.

5. *The Sheet Bath.*—A sheet wet with water at 80° F. (27° C.) is placed upon blankets on a bed or table, and the patient, with arms raised above his head, is tightly wrapped in it. Water is now poured upon the successive parts of the body, which are rubbed with the hand until warm, and then cooled by means

of colder water. When an area ceases to become warm, another part is attacked in like manner, and so on until the whole body has been subjected to the procedure.

6. *The Towel Bath.*—The patient being undressed and laid upon a blanket or muslin sheet under which a large rubber sheet has been placed, a thoroughly wet towel is placed smoothly over the back; rubbing is employed over this until it becomes warm. Then water is poured over the surface till it cools, friction is again employed, and the process repeated till the warmth ceases to return. The buttocks are next treated in like manner, and the back having been dried, the anterior surface receives the same treatment.

7. *The Ice Rub.*—This consists simply in rubbing the surface of the body with flat pieces of ice covered with gauze. The various parts of the body are treated one after another until they are cooled. The patient is then dried and properly covered. In excessively high temperatures the ice rub may be employed while the patient is in a tub bath.

8. *The Ice Pack.*—The patient, having been stripped, is laid upon a bed covered with a rubber sheet. An ice cap is applied to his head. Flat pieces of ice are arranged along the sides of the body, in the armpits and between the legs, and the body is rubbed with pieces of ice just as in the ice rub. The ice may be in direct contact with the skin or, better, wet cloths may be interposed.

9. *Ice Bags, Compresses and Coils.*—Ice bags are frequently used for the local application of cold. These are rubber bags of various shapes and sizes, being adapted in these respects to the portions of the body to which they are to be applied, and are fitted with screw caps. When in use they should be about three-quarters filled with ice broken into pieces the size of the end of the thumb. As little air as possible should be allowed in the bag.

Ice compresses are made by crushing the ice and spreading a layer of it between two folds of blanket or towel, preferably the latter, as it will absorb the meltings while the former will not. These compresses may be made of considerable size and applied over large areas, but their use has the extreme disadvantage that it is almost impossible during their employment to keep the bed and clothing dry.

Cold compresses, while they do not affect the temperature, often give the patient great comfort, especially when applied to local areas of pain. They are made of several layers of any fabric which will absorb and hold moisture, and are wrung out of water at the required temperature and applied. They may be renewed as often as is necessary, and it is well to have two in use at the same time; or they may be allowed to remain in contact with the patient's body continuously, the water lost by evaporation being supplied from time to time.

Ice coils of rubber tubing, arranged in various shapes to fit the different parts of the body, are often

used to reduce the heat of local inflammation. Water at the proper temperature is caused to run through the tubing by siphonage, the vessel from which it runs being placed above the patient and that into which it is discharged on the floor. Care should be taken that the former does not become exhausted. An ice coil may be made at home from ordinary flexible rubber tubing, laced together with narrow tape, and about twelve yards of tubing are required for the purpose. It may be coiled into circular, oval or rectangular form, depending upon the part to which the application is to be made. At each extremity of the tubing from four to six feet should be left free.

10. *Ice-water Enemata.*—These often cause a considerable fall in temperature, reaching as they do to the "heat-citadel" of the body. Hare has found that enemata of 65° F. (18.3° C.) lowered the body temperature 3° F. (1.5° C.) in thirty minutes. They should be given with a fountain syringe; never with a Davidson syringe, as the bowel has been ruptured by this instrument, owing to the sudden increase of pressure attendant upon squeezing the bulb. Two soft rectal tubes (one large, one small), after the air has been expelled, are well lubricated and passed up into the bowel; the large tube for a distance of about six inches, and the small tube about ten inches. The large tube must reach to a jar on the floor beside the bed, and the small one connects with the fountain syringe. In the place of the two catheters thus inserted, some pieces of rubber tubing may be attached

to a Kemp's tube, which is inserted into the rectum. The usual quantity of water injected is from one to two quarts, a return flow being allowed as the fluid passes in.

In using any of the above methods for the reduction of temperature the greatest watchfulness of the patient's condition should be observed, and any tendency to collapse, as evidenced by distress, weakening of the pulse, coldness of the extremities, and blueness of the lips, should cause the nurse to notify the physician immediately and to institute prompt restorative measures, such as the administration of whiskey, brandy or the aromatic spirit of ammonia, rubbing the hands and feet, hot-water bottles to the extremities and over the heart, and elevation of the foot of the bed.

If hyperpyrexia occur in the absence of the physician, it is the duty of the nurse to meet the emergency by the application of cold compresses and by cold sponging, in the meantime preparing for an ice-water enema and cold tub bath pending the arrival of the medical attendant.

The Treatment of Symptoms Referable to the Skin.—At the onset of a febrile disease it is often wise to induce free perspiration by the use of hot-water bottles, blankets, etc. During the course of the illness the patient's skin should be kept clean by a daily bath with warm water and soap. Dryness and harshness of the skin may be relieved by anointing the body with albolene or olive oil. Scales and pieces of epidermis that are cast off during and after contagious fevers

should always be destroyed, preferably by burning, as they may become sources of further infection. Special attention should be given the points where bed-sores are likely to form, namely the backs of the heels and over the buttocks and sacrum. The sheets must be kept smooth, and the bed thoroughly clean and free from crumbs, moisture and contamination from the discharges from the rectum and bladder. The chief consideration is to prevent the beginning of bed-sores by the strictest cleanliness; in addition to which measures to improve and harden the skin of the susceptible parts should be employed. To insure a good blood supply to these parts the patient should be turned upon his side several times a day, and the skin of the back thoroughly rubbed with a dry towel and dusted with talcum powder. Applications rubbed into the skin to harden it, such as salt, two drachms, to whiskey, one pint, or a dilute solution of lead subacetate may be employed. When the skin becomes red and irritated, dry powder sprinkled on a compress and held in place by strips of adhesive plaster may be used. If the skin is still unbroken, it should be painted with a solution of silver nitrate, twenty grains to one ounce of water. When a bed-sore has appeared, the patient, with the object of preventing its spread and of accelerating its cure, must be so placed as to take all weight from the affected part. This may be accomplished by the use of an inflatable rubber bed-ring. The sore itself must be kept clean by being swabbed with 1 to 5000 mercury bichloride solution, and dusted with

iodoform powder. A dressing of gauze on which zinc oxide ointment has been spread should also be applied. In advanced cases the use of the water-bed may become necessary. If the sore spreads and burrows into the surrounding parts, free opening and thorough irrigation are indicated.

The Treatment of Symptoms Referable to the Mucous Membranes.—Dry and cracked lips may be made more comfortable by gentle rubbing with albolene or cold cream. For the immediate relief of thirst, water, cracked ice, and acidulated drinks may be given as often as desired; a drink consisting of glycerin, one drachm, boric acid, half a drachm, to the tumblerful of water, may be found acceptable. The mouth should be kept sweet and clean by the employment of regular and frequent washings with dilute antiseptic solution (the official *liquor antisepticus*), tincture of myrrh, etc. The following are serviceable mouth-washes: Tincture of myrrh, one ounce, sodium bicarbonate, ten grains, water, four ounces; glycerin and lemon juice, equal parts; Dobell's solution. A very useful formula consists of equal parts of antiseptic solution, hydrogen dioxide solution, lime water, and water. The nurse should be careful to see that the mouth is washed after each drink of milk. There is no contra-indication to the use of the tooth brush. Sordes and coatings upon the tongue may be removed by swabs moistened in one of the above-mentioned solutions. A convenient tongue-scraper may be made of a piece of whale-bone bent into a loop. In cases where the tongue is ex-

tremely dry, the "tongue-bath" often affords much relief. This consists simply in holding the mouth full of fluid for several moments. In this way considerable moisture is absorbed by the mucous membrane.

The Treatment of Symptoms Referable to the Digestive Organs.—The nausea and vomiting may be relieved by restriction of diet and by the administration of cracked ice. All vomited matter should be carefully inspected by the nurse, and if it is unusual in appearance should be kept for examination by the physician. Excessive distention of the stomach or bowels by gas may be relieved by the application of hot compresses or by turpentine stupes made and applied by the following method: Required are a stupe wringer made of coarse dishtoweling, with a hem on each end through which are passed two smooth, round sticks, such as pieces of broom-handle, a large piece of flannel, a large layer of non-absorbent cotton, two pieces of flannel for stupes, a saucepan, an alcohol lamp, a fork or spoon, turpentine, hot water, and a medicine glass. Place the saucepan, containing one pint of boiling water and one drachm of turpentine, over the alcohol lamp; put the two stupes in the water; lift one of the stupes from the water into the stupe wringer with the fork, leaving the other in the water while the first is being applied; wring very dry, shake out to allow the air to touch all parts of the flannel, and apply hot; cover with the cotton. Change the stupes before they become cold, having the hot one ready to apply when the cold one is removed. When

the stupes are discontinued, dry the parts well, dust with talcum powder, and cover with the piece of warm, dry flannel. If marked redness and irritation are caused, the stupe should be at once removed and the skin anointed with albolene or olive oil. In many instances gaseous distention may be relieved by the insertion of a rectal tube through which the gas escapes, and perhaps even better than this is the administration of a high rectal irrigation of a warm salt solution (one drachm to the pint).

At the beginning of a fever the bowels should be opened by repeated small doses of calomel (one-tenth to one-fourth of a grain every half-hour up to six doses), followed by a saline, such as Rochelle salt or solution of magnesium citrate. During the course of the disease a daily movement of the bowels should be secured by this means, by other laxatives, or by enemata of warm soapsuds.

Diarrhœa occurs more especially in enteric fever and measles. This may be relieved by a mustard plaster to the abdomen (not in eruptive diseases), by flushing out the lower bowels with a warm saline solution, or by the injection into the rectum of from one to ten drops of laudanum in an ounce of starch mucilage.

The Treatment of Symptoms Referable to the Circulatory System.—The pulse in fever should be studiously watched by the nurse, and any marked change in its character reported at once to the physician, since by noting its action a fairly reliable estimate of the patient's general condition can usually be made.

In severe cases heart-weakness may call for stimulants such as whiskey. In extreme cases this may be administered hypodermatically, and in case of collapse hypodermatic injections of camphor and ether or camphor and olive oil may be given, when directed by the physician, with good effect.

The Treatment of Symptoms Referable to the Respiratory System.—The dry, irritating cough caused by tickling in the throat may often be relieved by a drink of water or milk or by the employment of a simple jujube troche or gum drop, or of gomenol bonbons. Various expectorant and sedative drugs are used in the cough which accompanies involvement of the lungs. If the cough is so frequent and severe as to cause soreness of the chest, this may be lessened by the application of hot compresses or by rubbing with various liniments which may be prescribed by the physician.

The Treatment of Symptoms Referable to the Urinary System.—The urine should be carefully examined by the nurse as to color and sediment, and its daily quantity noted; when directed she should save bottled and labeled specimens for the physician. Such a specimen to be of any diagnostic value should be a portion of the mixed urine of an entire twenty-four hours. In cases of diabetes, separate specimens of the urines of fasting and of digestion should be kept. Four ounces are, as a rule, a sufficient quantity; it is important that the bottle should be clean. Freer action of the kidneys may be secured, and the urine rendered

less irritating, by the administration of a saline diuretic, preferably perhaps in the form of "cream of tartar (potassium bitartrate) lemonade." This is prepared by dissolving one and one-half drachms of cream of tartar in a pint of boiling water. Allow it to cool, flavor with a little lemon juice or peel, add a little ice, and sweeten with sugar. This is a very palatable drink and may be taken *ad libitum.* When the urine is much diminished in quantity, or retention (a rare occurrence) is present, an increased flow of urine may be induced by hot applications over the kidneys or a high rectal irrigation of hot salt solution. In certain infectious diseases, notably typhoid fever, the urine is capable of transmitting the infection; consequently it should be handled with the greatest care and disinfected properly before being disposed of (*see* p. 79).

Seeming retention of the urine may be treated as above. Nervous patients who experience difficulty in voiding urine while in the recumbent position may be aided in starting the flow by the sound of running water or by having warm water poured over the pubes. When obstinate retention occurs and the patient is entirely unable to void the urine, catheterization must be practiced. This may be done by the nurse upon the physician's order. Soft-rubber catheters are preferable for males and glass instruments for females. The greatest care is necessary to keep these absolutely clean, for unless this is done infection may be carried into the bladder, and cystitis result. Such an accident

should never happen, and when it does is due to carelessness in the care of the catheters, lack of cleanliness of the hands of the person who performs the operation, or faulty technique in cleansing the patient's urethral orifice. Catheters should be boiled after using, and kept in a 1 to 5000 solution of mercury bichloride.

To catheterize a female patient the following articles will be required: a large sheet, a chest blanket, a small bed rubber, sterile towels, a drop light, two curved basins, two or more sterilized glass catheters, two dishes which have been sterilized by soaking in a 1 to 1000 solution of mercury bichloride, and sterile cotton balls. These having been conveniently arranged, proceed as follows:

Fill one dish with mercury bichloride, 1 to 5000, and put into this about six cotton balls; fill the other dish with boric acid solution, 4%, and into this dish place the catheters, previously boiled. The nurse should then screen the patient, drape her with the large sheet, in the dorsal position, and place a sterile towel and the rubber under her, and the dishes and curved basins on the bed; covering the latter with a sterile towel while she (the nurse) prepares her hands. These should be scrubbed well with green soap and running water, and then soaked in the mercury bichloride solution. Separate the labia and wash off the parts with the mercuric bichloride solution. Insert the catheter very gently into the urethra, being careful not to use force or touch any other part with the instrument. When the urine ceases to flow, place one finger over the end of

the catheter and withdraw it. It is wise to attach about a foot of rubber tubing to the open end of the glass catheter, in order to guard against its passing wholly into the bladder, and also to lessen the chances of soiling the bed-clothes with urine. When incontinence exists, a soft-rubber urinal may be useful.

The Treatment of Symptoms Referable to the Nervous System.—The discomfort of the initial chill (*rigor*) of febrile disease may be relieved by warm covering, by hot-water bottles to the extremities, by rubbing the body and limbs with warm woollen cloths, and by the administration of hot stimulant drinks. One drachm of aromatic spirit of ammonia in half a glass of hot water is usually effective. These measures are also applicable to the relief of chills occurring during the course of the disease. In children, convulsions may be treated by hot baths or by the administration of a few whiffs of chloroform from time to time. A mustard bath is very often given to children for convulsions. Two tablespoonfuls of mustard, tied up in a muslin bag, are used to the gallon of water at a temperature of 112° to 115° F. (44.4° to 46.1° C.). Before placing the child in the bath apply an ice compress to its head, and change this at intervals during the bath. The pulse must be carefully watched while the child is in the bath. The passage of a stomach tube and the washing out of the organ, or a rectal irrigation of warm saline solution, will frequently cause a cessation of the convulsions.

During convulsions in the course of febrile disease

the nurse must take care that the patient does himself no injury; beyond this the less he is restrained the better. Constricting clothing about neck or chest should be loosened to guard against interference with respiration. If there be movement of the lower jaw, some object such as a spool or roller bandage should be placed between the teeth, to prevent biting of the tongue.

The nurse by her manner can do much to lessen the irritability and discomfort of ordinary febrile disease. She should step quietly, talk little, notice everything, and, while not seeming officious in the least degree, anticipate every wish of the patient.

Headache may be lessened by cold or hot compresses to the seat of pain. Sometimes the cold will prove more efficacious, sometimes the hot; that which affords most relief should be selected.

Pain in the back and limbs may be mitigated by hot-water bags, by massage, or by rubbing with various embrocations. Dizziness is lessened by the recumbent position. When arising after a continued illness the patient should first be allowed to sit up in bed for an hour or two, a day or two later he may be helped to an easy chair for a short time, then short excursions around the room may be undertaken with the help of the nurse; until finally sufficient strength has been recovered to enable him to walk alone.

The mental symptoms are often relieved by the use of cold, as described above; when they take the form of active delirium various sedatives may be adminis-

tered, as the bromides. Chloral, with morphine as a last resort, should be given only under the authority of the physician. If restraint is necessary (and in extremes of delirium the strength of several persons may be required to hold a vigorous patient), it is legitimate to use a folded sheet extending from armpits to groins, laid over the patient and fastened under the bed with strong safety pins. Restraint by means of tying the hands and feet to the bed posts is never necessary.

During the marked weakness of severe febrile diseases the patient should not be allowed to move himself in bed; this must be done for him by the nurse. While the patient is in such condition as to be unable to make his wants known to the attendants, the greatest care must be taken that he receive his nourishment in proper quantity and at regular intervals, and especial watchfulness should be exercised lest the bladder become too full. Under these circumstances catheterization may become necessary. If his bowels move involuntarily the soiled clothing should be removed at once, and the patient thoroughly cleansed. Such a patient must be watched with great care.

Hiccough occasionally baffles all treatment. Cracked ice, a teaspoonful of salt and lemon juice or salt and vinegar, or a teaspoonful of raw whiskey, may prove efficacious. Obstinate cases may respond to the antispasmodic drugs or the hypodermatic use of morphine when ordered by the physician. In certain cases the use of electricity may meet with success.

The Treatment of Symptoms Referable to the

Organs of Special Sense.—The care of the tongue has been described in the section on mucous membranes.

The Nose.—Dryness and excoriation of the nostrils may be prevented by anointing these parts with albolene or olive oil, and the crusts which collect inside the nose may be softened and removed by swabs fashioned from toothpicks and bits of cotton and dipped in any of the alkaline solutions mentioned below. The patient should be encouraged to blow his nose, and additional cleanliness may be secured by the use of the hand-bulb atomizer filled with an alkaline spray solution such as the official antiseptic solution diluted one part to four or six of water. A necessary precaution in this process is not to allow the patient to blow his nose for some moments after the use of the spray; otherwise bits of the secretion may be forced into the Eustachian tubes, and inflammation of these and consequent middle ear disease possibly be caused. Nose-bleed (*epistaxis*) is usually controlled by elevating the head and shoulders of the patient, and placing ice-water compresses upon the forehead and root of the nose. A bit of absorbent cotton, wet to saturation with water as hot as can be borne, and inserted into each nostril, is usually effectual. If the hæmorrhage is severe and exhausting the physician should be notified.

The Ears.—The increased acuteness of hearing which may be present in fevers may be rendered less distressing by insisting upon quiet in the house, and especially in the sick-room. A ban should be put upon

loud conversation; attendants should speak in a low tone, but whispering is frequently extremely irritating to the patient. If there be much traffic about the house it is often wise to cause the pavements to be strewn with tan bark. The patient should be frequently questioned as to the presence of pain in the ear, and such an occurrence should be immediately reported to the physician. Such pain may be relieved by hot applications to the organ, by poultices around (never over) it, or by careful syringing with warm water. For poultice material the official kaolin cataplasm is preferable. It may become necessary to puncture the drum membrane in order to drain the tympanic cavity. This should be done only by the physician. When there is discharge from the auditory canal, cleanliness may be attained by syringing or by mopping with small cotton swabs moistened in weak antiseptic solution.

The Eyes.—Increased sensitiveness to light may be rendered less annoying by screening the patient's bed. This is preferable to darkening the apartment, for sunlight is a sick-room necessity. At night the room should be dimly lighted, and the lamp so shaded that its rays do not fall directly upon the patient. If there is tendency to dryness of the eyelids, these should be moistened with warm boric acid solution (full strength or half saturated). When there is tendency to increase of secretion and the lids stick together, the same agent may be used, or the edges of the lids lightly smeared with albolene or olive oil. The eyes should

not be used during the illness, and only to the slightest extent during convalescence. This is especially to be remembered in the care of cases of measles.

Feeding in Febrile Disease.—The diet of patients suffering from fever must be one consisting of food that will be easily digested and at the same time keep up the nutrition of the body. All food should be given in liquid form and should be of such character as to furnish as much nourishment for its volume as possible.

The objects to be attained in the dietetics of fever are:

(*a*) To supply nutriment sufficient to compensate for the tissue consumed.

(*b*) To give nourishment which will leave as little undigested residue as possible and which will not disturb the weakened organs of digestion.

In fevers with remissions of temperature it is best to give the largest amount of food while the temperature is low, for at this time the digestive and assimilative powers are best able to do their work.

Milk, since it offers the greatest amount of nourishment for its volume, would seem the ideal food, but it has its disadvantages. Of these the most important is that it is likely to coagulate in the stomach in large curds, which cause distress and are not easily acted upon by the juices of digestion. This fault may be obviated in various ways. The milk should be administered slowly, so that when coagulation occurs there will be a number of small curds, rather than a single large one.

By dilution with various carbonated waters, or by partial predigestion by peptonization, milk may be so prepared as to avoid disturbance from this cause. Peptonized milk may be prepared by the cold process: Into a clean quart bottle put pancreatin, five grains, and sodium bicarbonate, fifteen grains, and one teacupful of cold water; shake and add a pint of fresh milk; shake the mixture again, and immediately place on ice. When needed, shake the bottle, pour out the required portion, and replace on ice. If the warm process is ordered, prepare as above, but set the bottle in hot water, though not so hot that the whole hand cannot be held in it without discomfort—about 115° F. (44.1° C.). At the end of ten minutes place it on ice, in order to check further digestion and keep the milk from spoiling. Kumyss (milk which has undergone alcoholic fermentation) or matzoon (milk which has undergone lactic acid fermentation) are well borne by many patients who object to or are distressed by plain milk.

After milk in nutritive value in fevers come the different liquid preparations of meat—meat juice, soups, broths and the like. Soups and broths contain much less nutriment than milk, but on account of the high temperature at which they are usually taken, and on account of the salts which they contain, they possess certain stimulant properties which render them useful. Patients quickly tire of them, but by flavoring them with the different vegetable extracts, celery, onion, and the like, they may be made less monotonous. The

vegetable *purées* may be employed. These are prepared by thickening pure soups with powdered rice, arrowroot or flour.

In mild cases of fever, and in those of only short duration with little digestive disorder, the patient may be allowed the various semi-solid foods, such as oatmeal, arrowroot or barley gruel, milk toast, meat jelly, soft-boiled eggs, and the like.

Many patients insist that they cannot take milk, but most of these will find out their error if the nurse will exercise tact and gentle persuasion. It may be rendered palatable in various ways—for instance by the addition of half an ounce of strong coffee to each glass, or in the form of junket, which may be flavored with a little sherry or nutmeg. Matzoon, kumyss and the various proprietary foods, as malted milk, Mellin's food, etc., should be tried if milk really is impossible; and if these prove distasteful we must fall back upon the soups and gruels above mentioned. A diet of vegetable gruels alone will not provide sufficient nourishment; consequently these must be supplemented by egg-albumin, gelatin and broths. Eggs may be allowed; these are most digestible when raw or only slightly cooked. They may be taken beaten raw with milk, with or without a little brandy, or the yolk alone may be beaten with hot milk or water or with sweetened hot tea. The eggs should never be boiled, but should be placed in water that has been boiling, and allowed to stand for a quarter of an hour. This process cooks them slightly, and an egg thus prepared may prove

acceptable to patients to whom the idea of a raw egg is unpleasant.

Gelatin in meat, wine or fruit-juice jelly, or in the form of blanc-mange, which may be variously flavored, is often agreeable. These jellies must be given in connection with other foods, as they contain little nourishment in proportion to their volume.

Plain ice creams, preferably flavored with vanilla, are allowable. The following are types of diet which may be varied for individual patients:

(1) *Fluid Diet:* Milk, broths, bouillon, milk punch, eggnog, egg lemonade, egg albumin, beef juice, strained gruels, cocoa, cocoa shake, kumyss, matzoon, liquid peptonoids, lemon and wine jellies, buttermilk.

(2) *Soft Diet:* Soups (without vegetables), oysters, all cereals, milk toast, eggs (soft or poached), milk puddings, ice cream, scraped beef, toast, junket, tea, coffee, cocoa, milk.

(3) *Diabetic Diet:* Soups, ox-tail, turtle, bouillon; drinks, lemonade, coffee, cocoa (without sugar); meats (with discretion), fish, fowl; eggs, in every form; vegetables, lettuce, tomatoes, radishes, cucumbers, spinach, celery; fruits, lemons, oranges, currants; gluten bread, butter, nuts. This is intended for diabetic patients suffering from any intercurrent febrile disease.

Beverages in Febrile Disease.—In all fevers the liberal use of water, either plain or flavored with lemon juice, is necessary. It not only mitigates the thirst but acts as a diuretic and aids in "flushing" the system, through the kidneys. Patients in the later stages of

fevers who are unable to ask for it should be regularly given water in sufficient quantities by the nurse. Lemonade, if preferable to water, should be not too sweet, and, if the patient desires, may be made with any of the carbonated waters. The juice of squeezed fruit, strained and either clear or diluted with water, is often well-borne. It contains some nutriment, and is slightly laxative. Barley or oatmeal water, plain or sweetened and flavored with fruit juices, is often palatable. In the milder fevers tea or coffee once a day will do no harm, but when there is difficulty in sleeping, nervousness or indigestion these should be interdicted.

The nurse should remember that thirst is much more thoroughly assuaged by sipping than by taking considerable quantities at one time. The patient may be allowed to choose the temperature of his beverage, for he is much more likely to take the necessary quantity of fluid if this privilege be granted. Too much cold liquid in the stomach may cause cramps, and these may be avoided by giving only small quantities at a time.

Diet in Convalescence.—Patients who have passed through a protracted and severe illness should exercise great care in coming back to ordinary diet, for any alimentary disturbance may cause a rise in temperature and other untoward symptoms; consequently the return to solid diet should be gradual.

Often the first solid food allowed is a sandwich of dry toast or zwieback and scraped beef or minced chicken; later the variety may be increased by the

addition of soups thickened with rice, barley, plasmon, vermicelli or noodles. The various cereals, plain custards, and stewed fruits may be added in quick succession.

Below is given a diet list for convalescents from ordinary febrile diseases. Such a list must be greatly modified for typhoid fever patients or those who have suffered from other fevers which especially affect the digestive system.

First Day.

Breakfast.—Soft-boiled egg, zwieback, cocoa.

Luncheon.—Eggnog.

Dinner.—Bit of breast of chicken, slice of dry toast.

Luncheon.—Cup of hot bouillon.

Supper.—Scraped beef sandwich, lemon jelly, glass of milk.

Second Day.

Breakfast.—Poached egg on toast, cocoa.

Luncheon.—Cup of junket.

Dinner.—Purée of potato soup, crackers or zwieback, rice pudding with cream.

Luncheon.—Milk punch.

Supper.—Milk toast, wine jelly, cup of tea.

Third Day.

Breakfast.—Egg omelette, roll, coffee with cream and sugar.

Luncheon.—Hot beef broth.

Dinner.—Lamb broth with rice, bread and butter, a little vanilla ice cream.

Luncheon.—Cup custard.

Supper.—Half dozen raw oysters, crackers, junket, cup of tea.

Fourth Day.

Breakfast.—Baked apple with cream, oatmeal or other cereal with cream and sugar, soft egg, dry toast, coffee.

Luncheon.—Chicken broth.

Dinner.—Purée of celery soup, crackers, broiled lamb chop, mashed potato, wine jelly.

Luncheon.—Cup of junket.

Supper.—Scrambled eggs, dry toast.

Fifth Day.

Breakfast.—Orange, cereal with cream and sugar, coffee or cocoa, roll and butter, poached egg on toast.

Dinner.—Half dozen raw oysters, consommé with vermicelli, small piece of tenderloin steak, creamed potatoes, vanilla ice cream or lemon ice.

Supper.—Creamed toast, baked apple with cream, cup of tea.

CHAPTER IV.

GENERAL DIRECTIONS: DISINFECTION.

The Nurse: The Sick-room and its Furniture: The Patient: Quarantine: Disinfection.

The Nurse should go to her patient provided with her usual outfit, a description of which is unnecessary; she should be cleanly in person and attire, observant and tactful. Before commencing any procedure she should provide herself with all appliances, substances and apparatus needed for it, and bestow them in convenient places, so that its progress may not be interrupted. She should not, under any circumstances, converse, with either the patient or members of his family, upon other cases of like disease which she has cared for, and above all, she should not, no matter what she may think, criticise the attending physician's administration of the case.

The Sick-room.—From the standpoint of the nurse the following are important: A model sick-room should be situated as far remote as possible from the noises and odors of the house and of the street, and be near to the bath-room. It should, if possible, have two windows on different sides of the room and a fireplace. The room should be large, clean, light and airy, with a southwest exposure. The walls should be painted some neutral tint. If the disease is not contagious, pictures on the walls serve to break the monot-

ony of the sick-room. If curtains are used, they should be of light washable material, and should be frequently washed. Rugs may be used if small enough to be removed, shaken and aired daily. Unnecessary furniture and draperies should be removed. If possible, there should be a closet or dressing-room adjoining, where all utensils, medicines, etc., may be kept. In general, the apartment used by a person ill with febrile disease should be, if possible, at the top of the house, for the air here is purer than that nearer the ground. Since it is to be occupied during the term of illness by at least two persons, the patient and the nurse or nurses, it should be large. Every adult requires at least three thousand cubic feet per hour of fresh air, and this will necessitate a room the capacity of which is about six thousand feet. Such an apartment is approximately fourteen feet square by eleven feet high, or of such proportions that its cubic content is that of a room of these dimensions. A room of this size does not allow space for large pieces of furniture, and if it is to contain such its measurements must be correspondingly larger. A sufficient number of windows is necessary to insure plenty of light and proper ventilation, for while fever patients are more sensitive to sudden draughts than persons in health, fresh air is an all-important consideration. Too bright light in a sick-room is to be avoided; nevertheless the apartment should be kept cheery rather than gloomy. It will seldom be found necessary to darken the apartment except in cases involving brain or eye complications.

Proper shades for the windows will, when carefully disposed, be found to admit a sufficient degree of light. Ventilation in a private dwelling is usually provided by doors, windows and fireplaces, mechanical ventilation being seldom found in any except public buildings. Having recourse to these three means of ventilating the sick-room, we must contrive to arrange for sufficient change of air to afford proper ventilation without allowing draughts. The fireplace offers a fair outlet to vitiated air, but its chief fault is that its opening is near the floor, while impure air seeks the upper levels of the room atmosphere. An occasional fire built upon the hearth will increase the usefulness of this means of ventilation. Various appliances may be used to render the windows better ways of egress for impure air and of ingress for pure. One of the best of these is a piece of board four or five inches wide and as long as the width of the window-frame in which it is to be used. The window should be lowered from the top just far enough to admit the board, and when it is thus placed in position, there is between the upper and lower sashes a narrow space through which outside air may enter. Through the board may be bored holes of variable number, depending upon the temperature outside, through which the air of the room may make its exit. In cold weather, or when the outside air is smoky or dusty, the opening between the two sashes may be packed, with varying degrees of tightness, with cotton. The temperature of the room should be from 65° to 70° F. (18.4° to 21.1° C.) in cold

weather, and in summer as near this temperature as is practicable. In hot weather the blinds and windows should be kept partly closed during the day, and opened at night. An electric fan may add to the thoroughness of the ventilation and to the patient's comfort.

There should be no hangings, pictures or carpets, and as little furniture as possible in the ideal sick chamber; this must be insisted upon in cases of contagious disease. If there be a set wash-bowl in the apartment, it is well to keep its outlet plugged, lest impure air enter through a possibly defective trap. The floors and walls should be bare and smooth, so that they may be easily cleaned and washed with disinfectants if necessary. Adjoining the sick-room there should be a bath-room, with tub, wash-bowl and water-closet. All creaking doors and blinds should be oiled. The patient's apartment should be kept as fresh and cheery as possible, and cleanliness must be attained by daily mopping the floor with a mop dampened with a disinfecting solution (1 to 1000 mercury bichloride) and by wiping walls, wood work and furniture with cloths dampened in the same medium. If sweeping is absolutely necessary, the floor should first be dampened. Dry sweeping and dusting are to be absolutely forbidden.

Unpleasant odors may be dispelled by sprays of Labarraque's solution or of cologne water, unless disagreeable to the patient. Fresh flowers may be allowed in the room, but when removed they should be burned.

A roomy closet is a convenient and almost necessary adjunct; in it may be kept various unsightly utensils, medicine bottles, disinfecting solutions, and the like, and in non-contagious cases, bed-linen, towels, etc.

During the day the room may be kept as bright as the patient wishes. Should he prefer a dim light, this may be provided for by shading the windows and screening the bed. At night the lamp should be low and so disposed that its rays do not fall directly upon the patient.

The Furniture.—The bedstead preferably should be of metal of plain design, and furnished with a stiff wire mattress. The single bed is better than the double, since it permits the nurse to handle the patient with far greater ease. The iron hospital bedstead, which stands about six or eight inches higher from the floor than the common article, is much the most convenient. Four wooden blocks, each with a depression in its top, into which the casters fit, can be used to increase the height of an ordinary bedstead. The location of the bed should be such as to provide easy access to each side, out of the passage of draughts, and not in too bright light.

The mattress should be thin and stuffed with hair. In some hospitals, instead of a mattress, a number of blankets, folded to the proper shape and size and placed directly upon the springs, are used. These make an excellent and comfortable bed, the great advantage of which is ease of disinfection.

The sheets should be of cotton, rather than of linen,

and beneath the draw-sheet a piece of rubber or oil-cloth, to protect the mattress from discharges, should be placed. Folded newspapers will answer this purpose in an emergency.

Woollen blankets afford the best bed covering, being warmer for their weight and more easily disinfected than any other.

The other pieces of furniture in the room should be of plainest design and as few in number as possible. Two chairs (one of them a steamer-chair, perhaps, but neither of them rockers and both with as little upholstery as possible), two or three small tables (one of them a bed table—a table with its point of support at one side so that its top can be placed over the bed), a commode, a screen and a back rest, should be sufficient.

The Patient should wear a night shirt open entirely down the front, to facilitate changing and physical examinations by the physician. In the case of women the hair should be neatly braided in two strands, or if, as is very rarely considered necessary, it may be cropped. Severe febrile disease may be followed by loss of the hair; fortunately such a loss is rarely permanent.

The nurse should assist the patient at his toilet morning and evening; his face and hands should be gently bathed with wash cloth or cotton, soap and warm water; the mouth should be rinsed, and, when desirable, the teeth may be brushed. The hair should be neatly and freshly arranged, and shaving, with the permission of the physician, may be permitted. The patient should

be given a general cleansing bath with soap and warm water each day, and frequently his comfort may be greatly increased by an alcohol rub. If he is allowed to rise for urination and defecation he should be wrapped in a flannel dressing-gown and assisted to the commode, which must be placed near the bed. In severe cases it is always desirable that the bed-pan be used. Although some patients will insist upon their inability to use this vessel, a little tactful persuasion will generally convince them of their error. Should any accident befall during its use or that of the urinal, the soiled linen should be at once removed and the skin cleansed.

Visitors to patients ill with febrile diseases should be few, and it is better to permit none at all until the period of convalescence has begun. The fewer the visitors allowed, the less will the patient be distracted and excited, for even if visits please him their ultimate effect is untoward. If no visitors are allowed, then there is no danger of their contracting or transmitting the disease if it prove contagious. In cases of recognized contagious disease visitors must be absolutely interdicted. If the physician, as is his right and oft-times his duty, forbid all visitors (even members of the family) entrance into the patient's presence, the nurse can enforce the orders without causing hard-feeling toward herself.

The nurse should perform her various duties quietly and regularly, and, in particular, all duties directly affecting the patient should be transacted, if possible,

at the same time every day; making the bed and the patient's toilet, and especially administering his food, should be done according to schedule.

Usually the physician will call at about the same time each day, and, when method is the watchword of the sick-room, the nurse will always be prepared for his entrance either at the regular hour or at any other. Nothing is more disturbing to the entire scheme of sick-room administration than a visit from the medical attendant when the nurse is unprepared for the event. The nurse should rise at his entrance, if not already standing, and accompany him in his inspection of the apartment and patient. She should maintain a discreet silence, speaking only in response to questions. At the close of the visit, if there be anything not recorded upon the chart which she wishes to report, or any point which she wishes elucidated, she may make the report or the necessary inquiries. She must always note the physician's orders upon paper; on no account may she trust to memory for them. After his departure these should be put among the charts and records of the case upon which are noted the patient's temperature, pulse and respiration, number and character of stools, quantity of urine, time, quantity and character of feeding, medication, etc.

No one nurse alone is able to care for a severe illness, nor can she be expected to do night and day duty in a mild one; in the former contingency a second nurse is necessary, and in the latter a member of the family or a servant must give assistance.

In all severe illnesses a night as well as a day nurse is required, each caring for the patient for twelve of the twenty-four hours. Seven o'clock in the morning and seven in the evening are convenient hours for changing.

The nurse's meals should not be served in the sick-room for obvious reasons.

Disinfection During and After Febrile Diseases.—Since it is of paramount importance in the prevention of the spread of infectious fevers that all contaminated material should be properly treated, and proper disinfection carried out when the case is finished, and since upon the nurse the duty of seeing that this is accomplished frequently devolves, it is necessary that she should be thoroughly conversant with the means and methods to these ends.

In considering this subject it is well that a clear knowledge of the term "disinfectant" be insisted upon. Since so many substances are sold under this name which are far from being what they purport to be, it is necessary that the term should be strictly defined, and that only such substances be used in this important connection as are of known composition and efficacy.

All authorities are agreed that a true disinfectant is a substance which *destroys* all infectious organisms with which it comes in direct contact, while an antiseptic is one which merely checks the growth and multiplication of such germs, not, of necessity, destroying them; and that a deodorant is a substance

which has the effect of neutralizing offensive odors, acting as a germicide or not, as the case may be.

Steam under pressure is the most certain disinfectant, and the only one upon which we can safely rely for the disinfection of clothing, bedding and the like. *Sulphur dioxide gas* is an effective germicide, and it may be produced by burning ordinary sulphur, which is cheap and easily obtainable, or the sulphur candles specially prepared for disinfecting purposes. It must be remembered, however, that sulphur dioxide gas bleaches, and is otherwise injurious to delicate fabrics and gilded articles, such as picture frames.

Formaldehyde gas is an efficient disinfectant and is free from certain disadvantages which sulphur dioxide possesses, in that it does not affect fabrics and decorations to any appreciable extent. Tablets may be purchased of the apothecary, which, when burned in a specially constructed lamp, generate this gas. They are inexpensive and easily manipulated, but give off the gas so slowly that an apparatus which produces the gas rapidly and forces it into the apartment is far preferable. Such an apparatus is, unfortunately, complicated and expensive, but, if available, provides, perhaps, the best method of securing disinfection by formaldehyde.

It is absolutely necessary that disinfection of apartments be carried out in the absence of human beings, for it is quite impossible for respiration to be sustained in such an atmosphere as is requisite for the destruction of germ life. All attempts at disinfection during the patient's illness by means of placing vessels con-

taining phenol (carbolic acid) about the room, by burning bits of sulphur, or by spraying disinfectants into the air, are worse than futile, since they make the patient uncomfortable. Good ventilation will accomplish far more as regards disinfection than all these means combined.

Before leaving the sick-room, a patient who has had an infectious fever should be given a thorough bath and shampoo with soap and hot water, and then be sponged off with a 1 to 3000 solution of mercury bichloride, or immersed in a 1 to 5000 solution of bichloride bath. He then should be dressed in a clean night dress, and removed to another apartment, where he may put on other clothing.

After a patient has left the infected room the nurse should wash and disinfect all utensils, dishes and furniture. The bed should be taken to pieces and the sheets and pillow covers put to soak in five per cent. phenol (carbolic acid) solution. The mattress and blankets should be spread out, in order to allow the fumes from the disinfectant to reach all parts. The bed and spring mattress should be washed and disinfected with the same solution. All bureau drawers, closets and cupboards should be opened, to allow their contents to be disinfected. All cracks and crevices should be pasted over except around one window, which is to be opened first after the room has been fumigated. Dust from the floor and all waste should be placed in paper bags and sent to the furnace. Nothing else should be removed from the room until

after fumigation. If the room is to be disinfected from the inside, the preparations should be made in such a way that the nurse may strike the match the last thing before leaving. Before the nurse leaves the room she should take a thorough soap and water bath, wash her hair, and disinfect both body and hair with mercury bichloride solution, 1 to 3000. She should then envelop herself in a clean sheet and put on slippers which have not been used in the sick-room. As soon as she is outside the room the soles of the slippers should be washed off with a disinfectant.

The disinfection of the sick-room and its contents depends largely upon the means at the disposal of the physician and nurse. If a steam disinfecting plant is at hand, the bedding, draperies and other fabrics should be made into bundles, wrapped in clean sheets, and removed for steam disinfection. By carefully carrying such bundles, they may be transferred to the disinfecting station with little danger. The removal of all unnecessary articles at the beginning of the disease greatly simplifies the disinfecting process. The walls, if painted, should be treated in the same manner as the wood work; if they are papered they should be thoroughly rubbed with pieces of non-absorbent cotton; then, if practicable, the old paper should be removed and the walls repapered.

After these details have been attended to, all the windows and the doors, with one exception, should be closed and sealed by pasting strips of paper with common flour paste over all the cracks. The sealing

process is important, for upon the tightness of the room depends, in great measure, the efficacy of the disinfection. If the cracks allow the escape of the disinfecting gas, the process is of little value. Before sealing the last door all draperies which have not been removed must be spread out, and all drawers, closet doors, etc., widely opened.

Sulphur dioxide or formaldehyde gas may be used to disinfect the room. If the apartment is bare and contains little decoration, the former may be employed; if the reverse is the case, the latter is to be preferred. In sulphur disinfection four pounds of sulphur must be used for each 1000 cubic feet of room space. A simple method of generating the gas is as follows: Two or three bricks are laid upon the bottom of an ordinary wash-tub, and upon these is placed a dish-pan, or other metal receptacle, which is to hold the sulphur. The tub should contain enough water to cover the bricks and the bottom of the pan, so that there shall be no danger of fire. For this reason the vessel which holds the sulphur must never be placed directly upon the floor. The sulphur is to be broken into small pieces, over which alcohol is poured and set on fire by touching a match to the mixture. The operator should stand at as great a distance as possible while applying the match. If enough alcohol is used, the sulphur will be almost entirely consumed, and it is important that the pan should not contain too much sulphur, as in that case the combustion will not be complete. On this account it is better to use two or more pans for the

sulphur if the room is large. To produce proper disinfection it is necessary that moisture be present, and, if the weather is not damp, we must supply this. This may be done by boiling water over a gas stove or by pouring boiling water from one vessel into another in the room just before the disinfection is begun. Another method is to place a vessel of water a few inches above the burning sulphur. The sulphur should always be so prepared that it may be set on fire immediately after the moisture has been supplied. After the sulphur is lighted the room should be closed at once, and the door of exit sealed as described above.

If formaldehyde gas is employed, it may be generated from the tablets before mentioned or generated from formalin in an apparatus which sends the gas rapidly through a tube which may be passed into the keyhole of a door. The latter method is preferable, but less practicable, than the former.

Whichever method is chosen, the room should remain sealed for at least eight hours. Even at the end of this time great care must be exercised in entering the apartment, and in so doing it is wise to wrap the face in a wet towel and pass quickly to the unsealed window and open it, to allow the gas to escape and the fresh air to enter.

Disinfection of Excreta, etc.—During the illness all fæces, urine, pus from abscesses, and all other discharges, should be so disposed of that any infective material that they may contain shall be rendered harmless. All substances cast off from the body should be

received into glass or porcelain vessels containing a considerable quantity of disinfectant. The following are solutions adapted to this purpose:

1. 1 to 1000 mercury bichloride solution.
2. 5% phenol (carbolic acid) solution.
3. Calcium chloride, four ounces to one gallon of water. This last must be prepared freshly every day.

The ordinary disinfection of fæces in the sick-room by nurse or attendant is of little value. This is due to the facts that the solution is seldom of sufficient strength and that the fæcal matter is not thoroughly mixed with the disinfectant. The fæces must be carefully macerated, so that the disinfectant shall come in contact with every atom, and the mixture must be allowed to stand for several hours. It may then be disposed of through the water-closet or buried. Burying undisinfected stools cannot be too strongly condemned, and is a serious menace to the public health.

The urine should be mixed with at least one-tenth of its volume of 1 to 1000 bichloride solution, and allowed to stand for ten minutes before being thrown out.

Sputum should be expectorated into vessels containing 1 to 10 phenol (carbolic acid) solution, or the lime solution given above. Remnants of food should be disinfected in like manner. Pus dressings, etc., should be burned.

All bed-linen and clothing should be immersed in a three per cent. phenol (carbolic acid) solution immediately upon removal, and allowed to stand for at

least two hours before being sent to the laundry. Bichloride solution is not used now for disinfecting linen, as it leaves an indelible stain.

For other purposes it is advisable for the nurse to make a stock solution of twenty-five per cent. mercury bichloride, bottle it, and label it with a table giving the proportion to be added to water to make solutions of various strengths. From this stock bottle, solutions may be prepared as needed. This obviates waste of time in dissolving tablets, and is very economical.

The surface of the patient's body and that of the attendant, when soiled with discharges, should at once be washed with a suitable disinfecting agent (1 to 5000 bichloride). In diseases like small-pox and scarlet fever sponging the patient's body once a day with this solution is to be advised.

The nurse should always change her clothing and sterilize her hands before eating. The latter may be done by thorough washing with soap, hot water, and 1 to 5000 bichloride, a nail-brush being used in the process.

After death from an infectious disease the body should be sponged with bichloride or phenol solution, and, after the mouth, nostrils and anus have been plugged with pledgets of cotton moistened with either of these, it should be wrapped in a sheet saturated with a disinfectant, placed in a metallic or air-tight coffin, and buried as soon as possible. The disposal of such bodies by cremation is always to be preferred when practicable.

The Disinfection of Water-closets, Drains, Sinks and Privies.—In the disinfection of these nothing is more convenient and effective than lime chloride, which is a mixture of various chlorine compounds, or milk of lime, freely used; the latter is made by adding one pound of freshly slaked lime to two or three quarts of water. Lime chloride should be purchased in sealed packages only, otherwise its efficacy as a disinfectant is slight. Air-slaked lime is of no use as a disinfecting agent.

The fæcal discharges from patients suffering from dysentery, cholera or typhoid fever should never be finally disposed of without previous disinfection as described above. All sinks, drains, water-closets, etc., should be thoroughly flushed several times daily, and in the intervals of flushing chloride or milk of lime should be allowed to remain in them. The seats of commodes and water-closets must be immediately cleansed, with a disinfectant, of any discharges which may soil them.

CHAPTER V.

INFECTIONS OF CONTINUED TYPE.

Enteric Fever: Paratyphoid Fever: Weil's Disease: Typhus Fever: Yellow Fever: Influenza: Malta Fever: Mountain Fever: Acute Miliary Tuberculosis: Chronic Pulmonary Tuberculosis.

Enteric Fever.

Synonyms.—Typhoid Fever; Nervous Fever; Abdominal Typhus.

Definition.—A communicable fever lasting three to four weeks, marked by inflammation and ulceration of certain glands in the intestine, catarrhal inflammation of the mucous membrane lining the intestine, enlargement of the mesenteric lymph glands and the spleen, and an eruption of small rose-colored spots appearing in crops upon the chest, abdomen and flanks.

Causation.—The disease is both endemic and epidemic, and is found in all climates, although its severity may vary greatly in different places. It is more common in the Eastern and Middle States than farther west, and occurs continuously in the larger cities, in which there are a certain number of cases to be found at all times. The most favorable period for the disease is the late summer and early autumn, and it is more prevalent and severe in dry than in wet seasons. Young adults (15 to 35 years) are more susceptible than children and old persons. When there is no difference

in the exposure, the infection is equally frequent in males and in females. As is the case with all infectious fevers, not all exposed persons acquire the disease. Those in a debilitated condition are more likely to suffer from it than those in robust health, and some individuals seem to be more susceptible to the infection than others. One who has once had the disease seldom suffers from a second attack.

The actual cause of the disease is the *bacillus typhosus,* which was first described by Eberth in 1880. The bacillus gains entrance to the body usually through the alimentary tract, but may be breathed in with air contaminated by the dust of dried undisinfected stools. The germ is not destroyed by drying, and may live for months in the soil and upon clothing. It is not rendered harmless by freezing, and therefore the disease may be conveyed by ice. It may be taken into the body with water contaminated by sewage or milk from vessels washed with infected water, and upon vegetables which have been fertilized with sewage and oysters from beds near sewer exits. Flies may transmit the contagion by alighting upon food after having been infected from privies.

Summary of Nursing in Typhoid Fever.—The patient should be put to bed and kept in the recumbent position. He should be turned frequently to avoid bed-sores and hypostatic pneumonia. No pressure or friction should be made over the abdomen. The back should be kept clean and dry, and all prominent parts be well rubbed with alcohol, 50%, and dusted

with talcum powder. Fluid nourishment should be given every two hours, and the mouth, tongue and teeth cleansed with a mouth-wash before and after each feeding. The patient should have a daily bath. Enteric precautions should be started at once, and continued until after convalescence. The nurse should see that the patient voids urine and that the bowels move regularly; inspecting all stools for signs of hæmorrhage. The temperature should be taken every three hours, and complications carefully watched for.

Mouth: The mouth, tongue and teeth to be washed before and after each feeding. Mouth-washes: antiseptic solution, glycerin and lemon juice, or tincture of myrrh, one drachm, sodium bicarbonate, ten grains, water, four ounces.

Enteric Precautions: The nurse should thoroughly cleanse and disinfect her hands each time she waits on the patient. Separate dishes, utensils, thermometer, etc., should be provided. All linen, utensils, dishes, etc., should be disinfected after being used. Disinfectant should be kept in the bed-pan and, after use, more be poured over the contents, which must be covered and allowed to stand at least one half-hour before being emptied into the closet. All soiled linen, etc., should be carried in a foot-tub (never in the arms).

Temperature: To be taken every three hours by rectum, unless otherwise ordered. It may be reduced by hydrotherapy: tub-baths, alcohol sponges, slush baths, cold compresses, cold packs.

Dangers: Hæmorrhage, perforation, peritonitis.

Complications: Pneumonia, bronchitis, endocarditis, neuritis, thrombosis, phlebitis, abscess, peritonitis.

Diet.—Nourishment should be administered at regular intervals, both by night and by day. The appetite of the patient should not be consulted, for the subjects of typhoid are often apathetic and have no desire for food. The food (fluids) should be given at intervals of from two to four hours, according to the condition of the patient. Water should be given freely. Milk is the best diet, and it may be modified if necessary. Between one and three quarts should be taken daily, from four to eight ounces at a time. When modified, one to three ounces of lime water may be added to each glass of milk, or barley water and milk, equal parts, may be used. If the patient tires of the milk diet, or it disagrees with him, egg albumin, broth, eggnog, buttermilk or kumyss may be given. After the temperature has remained normal for from seven to ten days, the diet is usually changed to soft or light diet.

The following *menu* for convalescents may be of value:

First Day.—Milk toast or zwieback, crackers and milk, beef juice.

Second Day.—Chicken broth thickened with well cooked rice or vermicelli, very soft-boiled egg (let stand off the stove in boiling water for ten minutes).

Third Day.—Junket, beef broth, wine jelly, scraped raw beef.

Fourth Day.—Lightly boiled or poached egg, arrowroot or barley gruel, chicken jelly.

Fifth Day.—Junket, well boiled rice, a small amount of white meat of chicken or squab, apple sauce.

Sixth Day.—Scraped beef, poached egg, calves' foot jelly, baked custard, toast.

Seventh Day.—A small piece of broiled steak or chop, baked potato, baked apple; well boiled rice and cream for breakfast, junket for supper.

If the above diet agrees well and the temperature remains normal, the patient may gradually go on selected diet, such as

Purées of peas, carrots, tender string beans.

Meats: Roast chicken, squab or partridge, boiled white fish (trout), steak, chops.

Vegetables: Spinach, cauliflower, asparagus tips, boiled rice, baked potatoes.

Desserts.—Baked apples, apple sauce, junket, baked custards.

For some weeks care should be taken with the diet. Green fruits, green corn, and crabs should be avoided.

Nurses may infect their hands from stools, bath water, thermometers, etc., and laundresses who wash undisinfected clothing also may convey the bacilli to their mouths while eating with infected hands. The disease may likewise be transmitted by bath water which is splashed into the mouths of attendants. Many persons who drink the various bottled spring waters, hoping to avoid the disease, forget that the ice used may be contaminated and that infected water used in brushing the teeth is as dangerous as when drunk. It is important that the nurse should cool all mineral

waters, etc., by placing the bottles upon ice, rather than by mixing cracked ice with them.

The bacillus may be found in the fæces within five to ten days after the disease has begun, and it may remain in them not only during the attack, but all through the convalescence, though usually it disappears within about ten days after the fall of the temperature to normal.

The urine contains the typhoid germ in a considerable number of instances, but as a rule not until comparatively late in the disease. The organism often persists in the urine for some weeks after the patient has apparently recovered. It may also be found in the blood, the perspiration, the rose spots, the intestinal ulcers, and in the pus from abscesses which often complicate the disease, and it is probable that it exists in the expired air and in the sputum of cases complicated by bronchitis or pneumonia.

The Onset of the Disease.—Usually typhoid fever develops gradually, and the patient may be quite unable to fix definitely the first day of his disease. In ordinary cases the day upon which he went to bed is considered as the first day, but in hospital cases and many others the use of such a rule as a routine one will give rise to many errors.

The usual mode of onset is as follows: The patient notices slight chilly feelings, followed by feverish sensations, severe headache, nausea, vomiting and considerable prostration. Nose-bleed and cough are frequent early symptoms. Various unusual modes of onset may occur:

(*a*) *Ambulatory or Walking Typhoid.*—In this variety the patient keeps up and about and attempts to work. He realizes that he is not perfectly well, but feels hardly ill enough to go to bed. When he is first seen by the physician he may have a high fever and a well-developed rash. Such cases are likely to prove severe because of the lack of proper care in the early stages.

(*b*) *With Marked Gastro-intestinal Symptoms.*—The nausea may be severe and the vomiting almost continuous and very difficult of control. There may be profuse diarrhœa.

(*c*) *With Intense Pulmonary Symptoms.* — The usual cough accompanying the onset may be much accentuated, and the chill and pain in the side be of such character as to strongly suggest pneumonia.

(*d*) *With Symptoms Referable to the Kidneys.*—Dark or bloody urine containing albumin and casts may exceptionally be a feature of the onset.

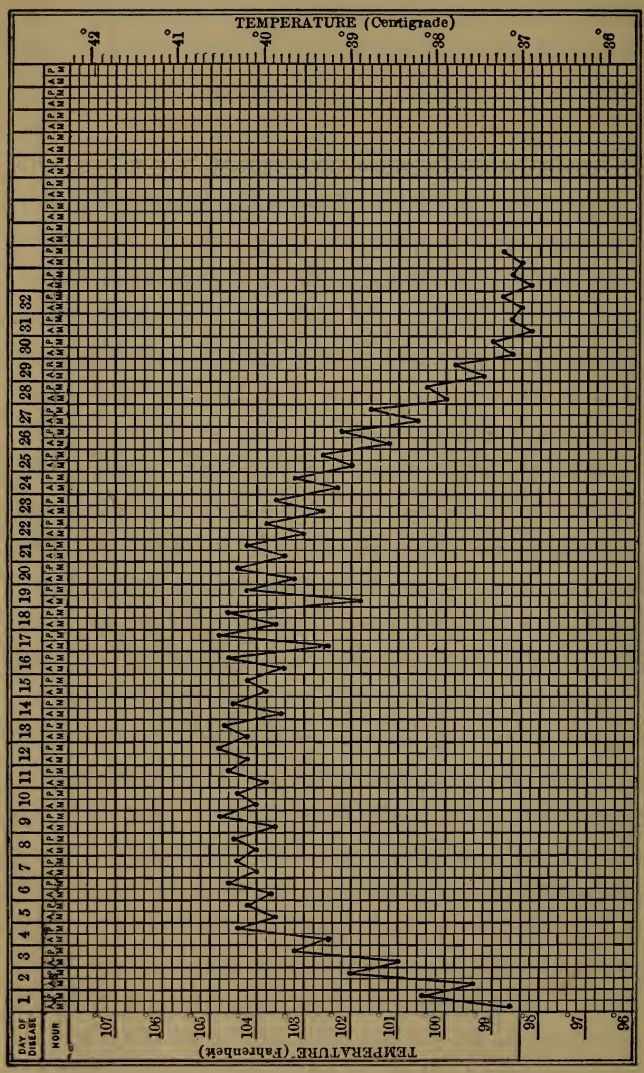
(*e*) *With Pronounced Nervous Symptoms.*—Agonizing and obstinate headache or facial neuralgia may be initial symptoms. In some cases when the patient has kept about during the early weeks delirium may be the first symptom to appear. Rarely the disease may begin with twitchings of the muscles or convulsions, stiffness of the neck, and dread of bright light. Drowsiness, apathy and stupor may exist for some days before other and more typical symptoms develop. Infrequently mania may be the first symptom. In alcoholic patients the various nervous manifestations are especially marked.

(*f*) *Hæmorrhage from the Intestine or Perforation of the Bowel* are very rare symptoms of the onset.

The Course of the Disease.—The incubation period is from ten to twenty days (usually about two weeks), and the ordinary duration of the disease is four weeks. To each week belong certain symptoms.

The typical temperature of typhoid fever is as follows: During the first week the temperature rises regularly each day, being lower in the morning than in the evening, but day by day the difference between these temperatures becomes less. The temperature the second week is continuously high, and there is little difference between that of the morning and that of the evening. In the third week the morning temperature becomes lower, while that of the evening remains as high as during the second week. The typical fourth-week temperature is one in which the morning temperature falls gradually lower, and that of the evening does likewise; dropping a little lower each day, until both it and the morning temperature reach normal. On the page following is depicted the chart of a typical case of typhoid fever in which the temperature has been uninfluenced by antipyretic drugs or baths.

Complications may alter the course of the temperature. Intestinal hæmorrhage and perforation are usually followed by a rapid and considerable fall. In fatal cases the temperature is likely to continue high until death. The height of the fever is, as a rule, in direct proportion to the severity of the disease, but in some fatal cases the temperature may never reach a very high level.



CLINICAL CHART OF ENTERIC FEVER OF FOUR WEEKS' DURATION, without complications, which shows the temperature curve as uninfluenced by treatment.

The pulse usually bears a direct relation to the temperature curve. In the first week it is full, strong and of 90 to 100 beats to the minute; during the second and third weeks it is likely to become more rapid, feeble and perhaps dicrotic.

Various deviations from the typical temperature curve are frequent. When the disease begins with a chill the fever may rise at once to 103° F. (39.5° C.) or 104° F. (40° C.). Often defervescence takes place at the end of the second week, and the temperature may fall to normal within twenty-four hours. A temperature higher in the morning and lower in the evening may occur, but has no particular significance. Sudden falls of temperature may take place, and usually indicate intestinal hæmorrhage or perforation. Hyperpyrexia (temperature above 106° F.—41.1° C.) is rare, but may occur just before death.

There may be chills at the beginning of the disease, at intervals during its course, with the onset of complications, after the use of antipyretic drugs, and during convalescence, without assignable cause.

Sweats may accompany the chills, but profuse perspiration is rare, though the abdomen and chest may at times be moist, especially during the reaction from a bath.

Rises of Temperature After Defervescence (*Recrudescences*) may take place even after there has been no fever for several days. Such rises may last for a number of days and then disappear. With these there is no constitutional disturbance, but they are, neverthe-

less, causes of anxiety. They are usually due to improper feeding, constipation, or unwonted mental exertion.

There are cases in which convalescence has apparently become established but which continue to have an evening rise of temperature of one or two degrees (F.). This may be due to starvation, but should cause one to search for complications. In excessively nervous patients such an evening rise is a frequent occurrence, but if the patient show no other symptoms it may be disregarded. It often disappears if the patient be allowed to sit up and be given solid food in small quantity, and the use of the thermometer be discontinued.

Relapses are due to a fresh infection, and may last varying lengths of time, but as a rule they are shorter than the original fever. The temperature rises and declines gradually, and is accompanied by a return of the symptoms.

Afebrile Typhoid (typhoid fever without rise of temperature) has been observed, but is of very rare occurrence.

Symptoms—*The Facial Appearance.*—Early in the disease the face is flushed and the eyes are bright; by the beginning of the second week the expression becomes apathetic, and at the height of the infection it is dull and listless. The lips and cheeks may retain a good color throughout the disease.

The Skin is usually dry. The typical eruption of typhoid fever appears in crops from the fifth to the

twelfth day of the disease and consists of small, isolated, rose-colored, slightly elevated, round or oval spots of about the diameter of a pinhead (two to four millimetres). They disappear on pressure, but immediately reappear when pressure is removed. They are seen earliest upon the back, and slightly later upon the front of the chest and abdomen. They may be found upon the arms and thighs, but very rarely upon the forearms and lower legs. They appear in successive crops, each crop lasting two to four days, while the whole eruptive period lasts from two to twenty-one days. Relapses show a fresh eruption, and the spots may appear after the establishment of convalescence. Some cases show no eruption whatever.

The Typhoid Tongue is at first moist, and down its centre is a strip of whitish fur; its edges and tip are red. In mild cases the tongue continues moist throughout the disease, but in severe cases it becomes dry, brown and cracked. Rarely it may remain clean, but become dry, glazed and fissured in the later weeks. As convalescence progresses the tongue gradually reassumes its normal appearance.

A Typical Case of Enteric Fever.—During the period of incubation of from ten to twenty-one days the patient suffers from indefinite feelings of languor and is disinclined toward exertion of any sort. He lacks energy and may complain of general muscular soreness.

First Week.—At the invasion of the disease there are indistinct chilly feelings (rarely a distinct chill),

severe frontal headache, and pains in the back and limbs; the tongue is coated down its centre, its edges and tip are redder and the papillæ more prominent than usual. There may be spontaneous nose-bleed and there is often cough due to slight laryngitis or bronchitis.

The eyes are suffused. The patient feels feverish, is thirsty, and complains of weariness, sleeplessness and nausea, which is often accompanied by vomiting. Constipation is the rule, but there may be diarrhœa. There may be sore-throat with pain on swallowing.

Patients during this stage of the disease may continue up and about (walking typhoid), but usually they find that they are more comfortable in bed. The temperature of the first week has been described. By the fifth or sixth day it reaches an evening height of 103° to 103.5° F. (39.5° to 39.8° C.). The pulse is rapid, strong and bounding, 90 to 100 per minute, and very rarely may be dicrotic. By the end of the week the typical facies of the disease appears and the expression is dull and lethargic. A few spots may have shown themselves and the spleen may be palpable.

Second Week.—As the second week progresses all the symptoms become accentuated, with the exception of the headache, nausea and vomiting. These usually cease. The temperature continues high (103.5° to 104° F.—39.8° to 40° C.), with slight morning remissions. The pulse becomes softer, feebler and more rapid (100 to 120). Bodily weakness is pronounced, and the patient has no desire to move. Early in the

week the rash becomes evident. The tongue is dry, brown and tremulous; there is likely to be diarrhœa, with three to five thin pale yellowish-brown stools a day (pea-soup stools). Mild delirium may appear late in this week; at first it may be present only at night, but later it lasts through the day as well, and the patient shows other signs of great nervous weakness, such as avoidance of light, slight deafness, and twitching of the muscles. If there is no delirium the patient is very stupid, takes no interest in his surroundings, and makes no requests.

Third Week.—The symptoms of the second week continue and become more pronounced. The temperature continues high, but as the week nears its close the morning temperature is likely to fall to a lower level (101° to 102° F.—38.3° to 38.9° C.). The pulse may become very rapid and weak, and perhaps dicrotic. The tongue becomes more dry and cracked, and the patient may be unable to protrude it. Bed-sores may appear, and retention of urine and incontinence of fæces occur. The nervous symptoms grow more marked, the twitchings are more noticeable, and the patient may pick at the bed-clothes and grasp at imaginary objects. Intestinal hæmorrhage may be evidenced by blood-tinged stools, or blood in considerable quantity may flow from the rectum, leaving the patient in collapse, with a sudden fall in temperature, imperceptible pulse, and other evidences of extreme prostration. Congestion of the lungs or pneumonia is liable to complicate the disease in this week. Distention of the

abdomen by gas is not infrequent. The patient may die or go on to

The Fourth Week.—Now the morning temperature falls still lower and the evening rise gradually becomes less, until the former reaches normal and the evening 101° to 102° F. (38.3° to 38.9° C.). As the fever diminishes the other symptoms gradually ameliorate; the tongue becomes moist and the pulse stronger, and the nervous manifestations disappear. A returning appetite may evidence the patient's improvement.

The Fifth Week.—The patient may go on to complete recovery, the fever may last two or three weeks longer in severe cases, or, after a normal temperature lasting several days, a relapse may take place.

Convalescence is slow. The patient is extremely weak, although he feels well and is extremely hungry. He is able to sit up only a few minutes at a time, and walking is well-nigh impossible. Relapses may be brought on by slight errors in diet or by over-exertion. The patient should not be allowed up for at least a week, and he should not be permitted to walk before the tenth day. There is usually some loss of hair, and in females dysmenorrhœa may occur. Full strength may not be recovered for a number of months.

Menstruation usually takes place early in the disease as in health, but in the later weeks and in convalescence may be absent. Pregnant women, though they rarely contract typhoid fever, are very apt to abort during its course.

Complications.—*Thrombosis* of the veins is a fairly frequent complication, and is caused by the stoppage by a clot of the flow of blood through a vessel. It occurs most often in the veins of the thigh and is indicated by swelling, œdema and tenderness of the affected part.

Hæmorrhage from the Intestine occurs in about four per cent. of all cases; there may be only slight streaks of blood in the stools or a free hæmorrhage which may or may not result in death. It is usually caused by the ulcers in the intestine destroying the coats of the blood-vessels, and is most frequent in the third week. It may appear without warning, and, if large, results in immediate collapse with its attending symptoms.

Perforation of the Bowel is less frequent, and is the most serious complication of the disease. It occurs usually in the third week and is the result of the ulcers eating their way entirely through the wall of the intestine; a catastrophe usually evidenced by sudden acute pain in the abdomen, rapid fall of temperature, and marked collapse. Peritonitis results, and this is indicated by vomiting, abdominal distention, tenderness and rigidity.

Peritonitis, without perforation, may occur by extension of the inflammation within the intestine to the peritoneum surrounding it.

Abscesses in various parts of the body (mostly in the parotid glands) may appear. These give the usual symptoms of abscesses from ordinary causes.

Typhoid Spine is a rare complication, and is the result of inflammation of and around the bodies of the vertebræ.

Bronchitis of mild or severe type occurs frequently at the onset and is evidenced by cough and more or less muco-purulent expectoration.

Pneumonia may complicate the disease early or in the later stages. In the latter case it may be overlooked, for frequently the symptoms are not well marked.

Neuritis (inflammation of the nerves) is fairly common, and may occur during the course of the disease or in convalescence. Its onset is marked by great pain and tenderness along the course of the affected nerves. There may be a slight degree of paralysis, usually involving the extensor muscles of the limbs and evidenced by wrist- and foot-drops.

Bed-sores may develop in severe cases and in those not well cared for. They are an unnecessary and dangerous complication.

Albuminuria is common, and when merely due to the infection is of little significance. It may, however, indicate a true nephritis.

Phlebitis, especially in the femoral vein, is occasionally encountered.

Various other complications are described, but are of more or less rarity.

Typhoid Fever in Children.—The disease is fairly common in children, but is rare in infants. Its course is mild and the symptoms, except the mental dulness and apathy, are usually not well marked.

Typhoid Fever in Old Persons.—After the age of forty the disease is rare, but of severe course, and although the temperature may not reach a high level, complications, especially pneumonia and heart-weakness, are frequent.

The Widal Reaction is an aid in the diagnosis of the disease, and is based upon the fact that the blood of a typhoid patient when added to a culture of the bacillus of Eberth causes the organisms to aggregate into "clumps" and to lose their motility. In the city of New York the Health Department employs bacteriologists who make this test upon specimens of blood sent in by physicians. A specimen is prepared by drawing from the patient's ear and collecting upon either end of a glass slide two good-sized drops of blood. These are allowed to dry, and the specimen is then ready for examination.

Prevention.—Since the disease is caused only by the entrance into the system of bacilli from other patients, the greatest attention on the part of the nurse should be given to the proper disinfection and disposal of *all* excreta. It is entirely insufficient to empty these into the various receptacles provided for their disposal; instead, it is absolutely necessary that they should be properly disinfected according to methods such as those described on page 79. Likewise the bed-clothing, bath water, the patient's garments, and all objects and utensils with which he or the nurse, after handling him, comes into contact, must be subjected to thorough disinfection before being used again. After his recovery

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the sick-room with all its furniture should be treated in accordance with the directions laid down in the section upon room disinfection.

The typhoid fever patient is unlikely to be a source of danger to those about him, provided these precautions are taken and the nurse is scrupulously clean in dress and person, always changing the former, sterilizing her hands, and washing her face before going to meals and upon leaving the sick-room for exercise, etc. She should also be very careful never to use her mouth as a receptacle for pins, pencils and the like, since carelessness in this regard may cost her her life.

Anti-typhoid Inoculation.—Recently attempts have been made with some success to prepare a serum which, when injected into healthy persons, may render them immune to typhoid fever, and experiments which were made upon the English soldiers during the Anglo-Boer war in South Africa lead us to believe that individuals so inoculated are much less prone to contract the disease, while, when they do suffer from it, they are much more likely to recover than those uninoculated. Unfortunately, immunity so conferred lasts only for a period of weeks. It may be safely affirmed that the measure is one which, in properly selected cases, is not dangerous, and it should not be neglected when there it probability of exposure to the disease.

Treatment.—The specific treatment of typhoid fever by means of an antitoxin has as yet given no very favorable results.

The value of the antiseptic treatment of typhoid fever has never been questioned. The only difficulty is how best to secure its efficiency. This may be done most efficaciously by the administration early in the disease of certain intestinal antiseptics, such as beta-naphthol bismuth, or eudoxin, and, after the first week, of the official compound solution of chlorine in one or two drachm doses every three or four hours. In such doses the chlorine solution can be safely administered until complete disinfection of the alimentary tract is obtained. Under its use the tongue becomes cleaner, the appetite and digestion better, the fever lower, and the stools devoid of odor, save that due to chlorine. The general strength, intellectual processes and nervous conditions improve, the disease is shortened, and the patient usually proceeds to a rapid and complete recovery.

During the course of the disease a daily movement of the bowels should be secured by means of rectal enemata.

At the present time the treatment of typhoid fever by the Brand, or more properly the Currie-Jürgensen, bath, is enjoying considerable vogue. Brand's original method has been modified, so that the consensus of opinion is now in favor of tub bathing at a temperature of from 80° to 90° F. (26.7° to 32.2° C.), although certain authorities believe that tubbing at 98° F. (36.7° C.) produces quite as good results, while much less disturbing to the patient. The duration of the baths is usually ten minutes. The patient should be

lifted both into and out of the bath; he should be immersed to the neck and his head covered with an ice-cap or cold cloth. Throughout the procedure he should be gently but thoroughly rubbed by the hands of at least two attendants. Stimulants should follow the bath and in weak patients should precede it. At the conclusion of the measure the patient should be dried in the recumbent posture, and, if chilly, warmly covered. Fresh water should be used for each bath.

Spongings, sprinkle baths, cold wet packs, evaporation baths and the application of cold water-bags may be used when tubbing is contra-indicated, but are much less efficacious. Perhaps the best substitute for the tub bath is the bed bath (see p. 38).

The frequency of the baths is governed by the height of temperature, the severity of the nervous symptoms, the strength of the pulse, and the general condition. Old age, as well as the slightest indication of hæmorrhage, peritonitis, extreme heart-weakness, arteriosclerosis, pneumonia, pleuritic effusion, or phlebitis are contra-indications to tub bathing. The menstrual period and pregnancy do not absolutely contra-indicate. Obese persons should be bathed with care. There are patients who, for no apparent reason, do not bear tubbing well, and in such cases it is wise to omit the process.

When heart-weakness occurs in the course of the disease it may be counteracted by alcohol and other stimulants. The headache, restlessness, sleeplessness and delirium may be controlled by hot or cold applications and sedative drugs. Bismuth and opium may be given

if the stools become too frequent. The genito-urinary tract may be rendered less septic and the urine less infectious by the administration of hexamethylenamine (urotropin) in doses of five grains three times a day. The drug should be well diluted and thoroughly dissolved, and must be given with care. It is well to use it in the later weeks of the disease and during convalescence, if not throughout the whole course of the infection.

Neither this nor any of the drugs mentioned above must ever be given by the nurse save when directed by the attending physician.

The disease in children may be managed in practically the same manner as in adults. Tub baths, however, are less well borne, and fortunately the disease runs a milder course in the younger patients.

The Treatment of Complications.—At the least sign of *intestinal hæmorrhage* the strictest quiet must be enjoined, the patient must not be moved even to have his soiled linen changed, and food must be temporarily stopped. When feeding is begun again, only such foods as are digested in the stomach and upper part of the intestine, such as beef-juice or peptonized milk, should be given, and these in very small quantities at a time. If the patient is being bathed, the baths must be omitted. Applications of cold in the form of compresses or the ice-coil should be made to the abdomen. If there are signs of collapse, the foot of the bed must be raised and, upon the physician's order, hypodermatic stimulation administered (whiskey),

while hot normal salt solution, injected either directly into a vein or under the skin of the thighs or buttocks, may be necessary. Drugs calculated to stop the bleeding may be ordered by the medical attendant.

Perforation of the Bowel.—When perforation takes place absolute quiet is necessary until a surgical operation can be performed, and this should be done as soon as possible after the diagnosis has been made.

Peritonitis calls for the enforcement of complete quiet, the application of cold to the abdomen, and great care in the administration of food.

Tympanites (abdominal distention by gas) may be diminished by the insertion of a rectal tube, by the application of hot-water bags or turpentine stupes to the abdomen, by the administration of a few drops of turpentine internally, or by high rectal injections of hot saline solution upon the physician's order. Often by stopping the milk for from twenty-four to forty-eight hours we may prevent the formation of gas. In the interval, broths and albumin water may be given.

Thrombosis is treated by the elevation of the affected part and by cold applications. The patient must remain quiet, lest portions of the clot, becoming dislodged, get into the circulating blood and cause thrombosis elsewhere.

Bed-sores should be guarded against by the strictest attention to cleanliness and by the other precautions mentioned on page 46.

Constipation may be overcome by mild laxatives or by enemata of soapsuds. The latter should not be

large and must always be given from a fountain syringe, with great care, and only upon the physician's order.

Recrudescences and Relapses.—The management of the latter is identical with that of the disease itself, but the former are a more serious matter; in them only the mildest hydrotherapeutic measures should be used, and heavy stimulation may be necessary.

The Diet.—While the febrile movement is present only fluid diet is allowable. Most patients do well upon a diet of milk alone (*see* pp. 58, 85). The milk may be cold, warm or boiled, as the patient prefers. It may be more acceptable if a little Vichy or other carbonated water be added, or if flavored with a few teaspoonfuls of French coffee. When milk cannot be tolerated, matzoon, kumyss or buttermilk may be substituted. If milk disagrees, the tongue becomes heavily coated and tympanites, constipation or diarrhœa with undigested curds in the stools may ensue. Such symptoms may be relieved by diluting the milk with equal parts of lime water or Vichy, by peptonizing the milk or by replacing it with a diet of beef, lamb or chicken broths and albumin water. The broths may prove more palatable when flavored with various vegetable extracts (onion, celery, etc.). The different prepared foods (malted milk, plasmon, etc.) and gruels may be tried; an occasional cup of cocoa will do no harm.

If the patient goes to sleep quickly after being wakened, feeding should be continued at proper intervals during the night; otherwise one or two feedings should be omitted.

The nurse must always record the total quantity of food taken each day.

Fluid diet as a rule should be continued for at least one week after the temperature has fallen to normal, but some patients, after all the symptoms have disappeared, continue to have an evening rise of temperature of two or three degrees (F.); to such, if the nutrition is impaired and the need of food is manifest, a gradual return to solid diet may be allowed. Usually the temperature promptly subsides and no harm is done.

The articles of solid food which are allowed first are *purée* soups, broths with rice, milk toast, soft-boiled eggs, junket and the like (*see* p. 85).

Relapses and recrudescences necessitate an immediate return to fluid diet.

Nursing.—In a private house the bed should, when possible, be in a large, light, well-ventilated room from which all hangings and superfluous furniture have been removed. The temperature should not be above 70° F. (21.1° C.), and it is better to have it as low as 60° F. (15.5° C.). In favorable weather the windows should be open. Too bright light and too much darkness are equally to be avoided. The bed should not be too heavily covered, and the bed linen must be frequently changed and kept perfectly smooth. In severe cases the air or water bed may be necessary. Early in the disease the patient should lie on his back, but later the nurse should encourage him to change his attitude, in order to guard against pulmonary congestion and bed-sores. The mouth, teeth and tongue

should be frequently cleansed. Studious attention should be given to the proper cleanliness of the body, and all points at which bed-sores are likely to develop should receive special care. The bowels and bladder should be evacuated only when the patient is lying on his back; the stools must be carefully watched for blood and milk-curds, and if these occur they must be at once reported to the physician. The quantity, color and sediment of the urine must be noted.

When involuntary movements and urination are unavoidable, the soiled bed-clothing, which should be promptly disinfected, must be immediately replaced by clean linen. In such cases the change is greatly facilitated by having two beds and moving the patient when necessary from one to the other; at least two attendants are necessary for this process, since the patient must remain absolutely passive.

The apartment should be kept quiet and free from disturbance of any kind, for complete mental inactivity on the part of the patient is necessary. On this account visitors and all distractions should be forbidden.

It is best to have two nurses, and a member of the family may be allowed in the room when additional aid is needed. The bed should be of single size and high, with a firm, comfortable mattress protected by a rubber sheet. The clothing under the patient must be kept smooth to prevent bed-sores, and in warm weather if he wears no night-shirt, and is covered only by a sheet, he will be more comfortable and will be spared the inconvenience of being undressed for each bath if

baths are given. Under these circumstances wrinkling of the clothing under him will be less likely to occur, and the possibility of taking cold is very slight.

The patient's head should be kept low, and nourishment should be administered through a tube or from a spouted cup. Temperature, pulse and respiration should be taken every three hours, but at night, unless the fever is above 103° F. (38.5° C.), it is wise to allow the patient to sleep without interference. He should not be allowed to see the temperature chart lest this occasion undue worry about his condition.

If the mind is clear it is well to explain the danger of attempting to sit up and of sudden movement, and if there is the least sign of mental aberration or delirium the patient must not be left alone for an instant.

The nurse should assist the patient to change his position at intervals during the later weeks of the disease, even if he does not complain of discomfort.

On points other than those mentioned above the nursing of enteric fever should be carried on in accordance with the principles laid down in the sections on fever nursing in general.

Paratyphoid Fever.

This disease differs in no essential from true typhoid fever except in its cause. This is a bacillus intermediate in form between the true typhoid bacillus and the common colon bacillus. The symptoms, course, treatment and nursing of the two diseases are practically identical; in fact their differential diagnosis is

impossible except by demonstrating the organism in the patient's blood or excreta. All that has been said in the previous section with regard to typhoid fever, except the paragraphs upon preventive inoculation and serum treatment, applies also to the paratyphoid infection. In the latter disease the sera for preventive inoculation and treatment must of necessity be products of the growth of the paratyphoid bacillus.

Weil's Disease.

Synonym.—Acute Febrile Jaundice.

Definition.—Weil's disease is an acute infectious fever, characterized by severe pains in the muscles, jaundice, nephritis, and a remittent temperature, which falls by crisis or rapid lysis.

Causation.—It usually occurs in the summer months and is most commonly seen in young adult males. Its specific cause is probably a microörganism which has not yet been identified.

Course and Symptoms.—The incubation period is usually about one week. The onset is sudden, with a chill followed by fever, headache and severe pains in the muscles. About the second day there is jaundice, which later may become more pronounced, and it is accompanied by itching. The temperature ranges from about 103° to 104° F. (39.5° to 40° C.), but may reach 107° F. (41.6° C.). There may be vomiting and diarrhœa; rarely there is delirium or coma. The liver and spleen are enlarged and tender; the urine contains bile pigment, albumin, casts and perhaps blood.

The stools may be clay-colored. The disease usually continues from five to eight days, when the fever falls and the symptoms abate. The mild cases usually recover rapidly, the more severe ones may be protracted; ultimate recovery, however, is the rule.

The disease derives particular interest from the fact that it is easily confounded with enteric fever.

Treatment.—The treatment is entirely symptomatic. The headache may be relieved by compresses, the muscular pains may be controlled by rubbing with some counter-irritating liniment, the bowels should be kept open, and during the febrile stage the patient should be kept in bed.

Diet.—The nephritis present makes a fluid diet absolutely necessary. When the temperature has fallen and the nephritis has subsided, a gradual return to ordinary diet is proper.

The nursing is to be conducted along general lines.

Typhus Fever.

Synonyms.—Jail, Camp, Ship, Hospital, Putrid or Spotted Fever; Black Death.

Definition.—An acute infectious disease characterized by a typical skin eruption, nervous symptoms, and a high temperature, terminating usually by crisis in about two weeks. The disease was very common in former times, but is becoming comparatively rare because of the increased attention paid to sanitation.

Causation.—It is most common in young adults, but no age is exempt. Filthy conditions, unhygienic

surroundings, poor ventilation, etc., favor the occurrence of the disease. Typhus fever is probably caused by a microörganism which has not yet been discovered. The contagion is easily acquired and difficult to destroy; it seems to float in the air and to be given off from the surface of the patient's body; consequently the disease is communicable from person to person and through clothing, bedding, furniture and the like. The contagion cannot, however, be carried through the air from hospitals to dwellings in the vicinity. Typhus patients give off in the breath and from their bodies a peculiar odor, and persons who perceive this most acutely seem to be most apt to contract the disease. If the sick-room is thoroughly ventilated, visitors spending only a few moments with the patient are not likely to become infected. It is believed that the patient's excreta do not spread the disease. Typhus fever is most easily contracted by persons in poor condition and unhealthy surroundings, but few escape if sufficiently exposed. It is unusual for one individual to suffer two attacks.

Course and Symptoms.—The incubation period varies from a few hours to twenty days. These extremes are rare, however, the usual period being from eight to twelve days. The average duration of the disease is from twelve to fourteen days.

The most noticeable symptoms are fever, headache, mental symptoms, and the eruption.

The onset is usually sudden, with a chill followed by fever, severe headache, and pains in the back and limbs; there may be nausea and vomiting; the bowels

are usually constipated. During the first week the face is congested and apathetic, presenting a peculiar appearance, so that once seen it is always recognized, and during the second week the patient's appearance resembles that of the third week of typhoid fever. After the initial chill the temperature rises rapidly and reaches its greatest height (usually 104° to 106° F.—40° to 41.1° C.) from the fourth to the seventh day. At first the fever is practically continuous, but as the second week begins there are morning remissions.

The pulse is at first rapid (100) and full; later it is likely to become rapid and feeble, or it may remain slow and feeble or rapid and feeble throughout the disease.

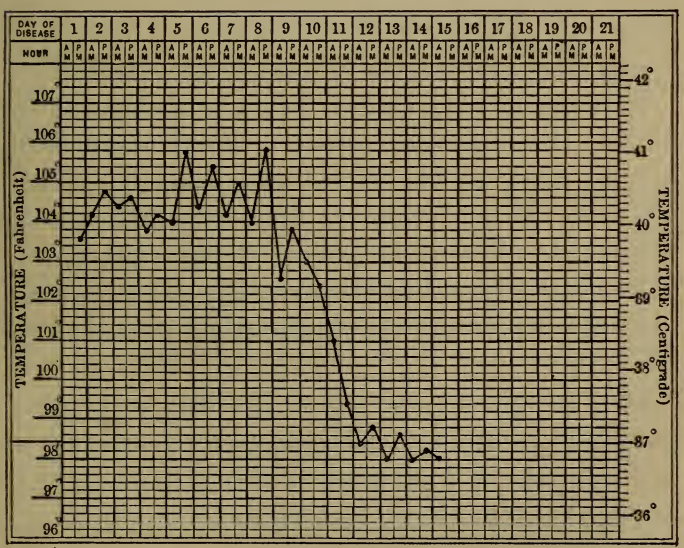
The respirations are rapid, and this rapidity may be increased during the second week as a result of pulmonary complications.

The rash is constant; it appears from the fourth to the seventh day and lasts for from seven to ten days. There is but one crop, and it is seen on the arms, legs and trunk; being most typical on the front of the forearms and shoulders. It is in the form of irregular, slightly elevated, rounded, pinkish blotches, from the size of a pinhead to that of a split pea. Later in the disease the spots become darker in color and the intervening skin may be reddened or mottled. From the eighth to the tenth day small ecchymoses within the blotches, which have now become brownish in color, may appear, and small bluish petechiæ may also manifest themselves. These last may persist after the dis-

appearance of the original rash. After the eruption has disappeared desquamation usually takes place. Children, in whom the disease is rarely fatal, sometimes show no rash whatever, and are quite likely to be free from the petechiæ.

The urine is diminished, darkened in color, and increased in acidity, and is likely to contain albumin and casts.

The marked nervous symptoms, such as alternating



CLINICAL CHART OF TYPHUS FEVER ENDING IN RECOVERY.

delirium and stupor, muscular twitching, picking at the bed-clothing, etc., appear in the second week.

In the favorable types of the disease, at the end of the second week the temperature falls rapidly, the

symptoms subside, the patient is able to sleep, and convalescence ensues.

Relapses are rare, and bronchitis and broncho-pneumonia are the most frequent complications.

The prognosis of typhus fever is always grave.

Prevention.—The spread of the disease should be guarded against by isolation of the patient and the strictest quarantine. All the excreta, bed-clothing, utensils, the sick-room, etc., should be disinfected as in typhoid fever. It is very important that the apartment should be thoroughly aired for several weeks after having been subjected to the process of disinfection.

Treatment.—The patient should be confined to bed, his diet should consist entirely of fluids (milk, broths and the like), and he should be encouraged to drink copiously of cold water. After convalescence has begun solid diet may be allowed within a few days.

No drug is known which exerts any specific influence upon the disease, and the symptoms are treated as they arise.

It is of the utmost importance that there be an abundance of fresh air in the sick-room. During the last epidemic in New York it was found that those patients bore the disease best who were treated in tents in the open air.

For the fever, if above 102° F. (38.9° C.), cold baths may be given; the bowels should be kept open by mild laxatives; the employment of whiskey or other stimulants may be necessary to combat the heart-weakness. For the nervous symptoms various sedatives are indicated.

The nurse should endeavor to spend most of the time, when not in actual attendance upon the patient, near an open window or in fresh air. Otherwise the nursing of the disease should be conducted along the lines laid down for the nursing of febrile disease in general.

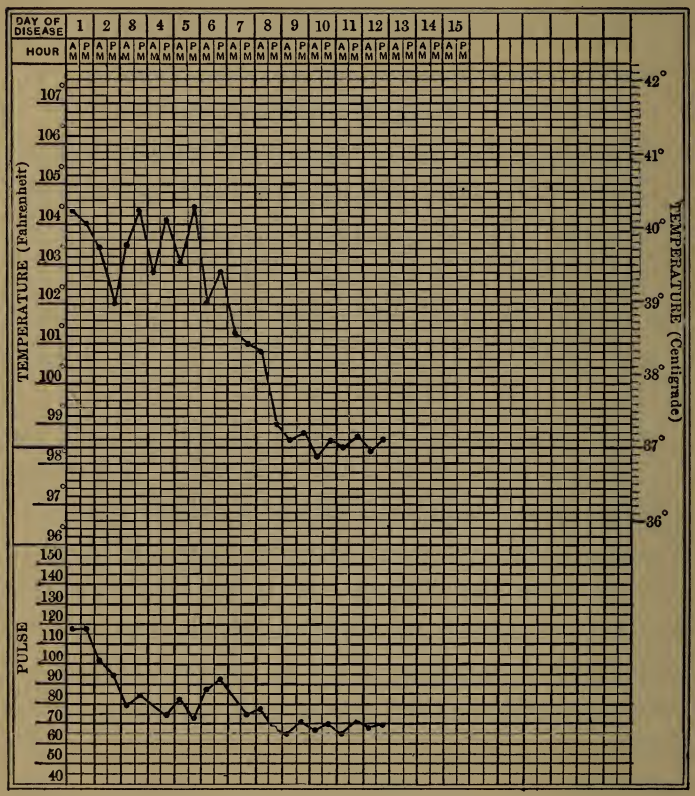
Yellow Fever.

Definition.—An acute infectious febrile disease evidenced by jaundice, vomiting of blood, and extreme prostration. The disease is endemic in the West Indies, Central America, and the west coast of Africa. From time to time epidemics have appeared in the Southern United States and also occasionally in the Middle States.

Causation.—The specific germ of yellow fever has not yet been discovered beyond question. It is transmitted to man through the bite of a certain species of mosquito which has previously fed upon the blood of those ill with the disease. It is not probable that infection is carried in clothing, ships, etc. Young infants and the aged are likely to escape. Whites are more susceptible to the contagion than negroes. Epidemics cease after a frost, as the low temperature kills the mosquitoes. An individual who has suffered one attack is very unlikely to be infected a second time.

Course and Symptoms.—The incubation period varies from three to six days. The invasion of the disease is extremely acute and marks the commencement of

The First Stage.—The onset is marked by chilly feelings or a convulsion, with rapid rise of temperature to 102° to 105° F. (38.9° to 40.5° C.). With slight



CLINICAL CHART OF A YELLOW FEVER PATIENT showing the pulse typically slow in comparison to the height of the temperature.

variations the fever lasts from three to four days, falling by lysis. There are severe headache and general pains, sore-throat, vomiting, restlessness and great

prostration. The face is flushed, the eyes reddened and watery, and there is dread of bright light. The pulse is weak and slow in proportion to the height of the temperature, and may become slower than normal before the fever declines. The tongue is red and dry and the gums are sore. The patient vomits, first the contents of the stomach, and then mucus, bile and blood. The bowels are usually constipated, but the stools are not light in color. The urine is scanty, high-colored, and usually contains albumin. About the second or third day the whites of the eyes become yellowish, and later jaundice appears over the entire surface of the body.

The Second, or Stage of Calm, appears when the fever declines; the symptoms gradually disappear, and the patient goes on to recovery, or, after a period lasting from a few hours to a day or two, he becomes worse and goes on to

The Third Stage, which is marked by extreme prostration, normal or elevated temperature, soft and very slow pulse, and hæmorrhages. Bleeding into the stomach and the vomiting of the partly decomposed blood (black vomit) occurs, and tarry stools may be observed. Hæmorrhages from the nose, gums, uterus and kidneys and into the skin are not infrequent. The jaundice persists, and there may be suppression of urine, followed by convulsions and death due to uræmia.

If the patient recovers the symptoms slowly ameliorate, and prolonged convalescence takes place.

Complications and relapses are rare.

The disease may vary from the *regular type* and be very mild, lasting but two or three days, and showing none of the usual symptoms; or it may be *malignant,* with little or no rise in temperature and early stupor or coma, followed in three or four days by death.

Prevention.—Quarantine, in the light of present knowledge of the method of transmission of yellow fever, seems unnecessary, but as a precaution it is best to isolate the patient.

Prevention consists chiefly in protection from and destruction of the mosquitoes. How effectually this prevents the disease is evidenced by its rarity in Havana since proper steps have been taken in this direction. Mosquitoes may be destroyed by sulphur fumigation in dwellings and prevented from entering by screens.

Patients suffering from the disease should be surrounded by netting. Curative and preventive inoculation by various serums appears to be of little use. Even though it seems improbable that yellow fever can be transmitted by means of clothing and the like, it is wise to disinfect the patient's apartment and all articles with which he has come in contact according to the methods employed after smallpox and the other infectious diseases.

Treatment.—The patient should not be moved after the onset of the disease, and strictest quiet must be enjoined. If he cannot urinate while lying in bed he must be catheterized. All body and bed linen must be changed with the utmost care to disturb the patient to the least possible degree.

The symptoms should be treated as they arise. During the active stage all medicine must be given per rectum or hypodermatically; never by the mouth. For the vomiting, cracked ice may be given, and a mustard plaster or hot poultice applied to the upper abdomen. No purgatives should be given. Suppression of the urine may sometimes be relieved by hot packs over the region of the bladder, high rectal enemata of normal salt solution, and alkaline diuretics. The hæmorrhages are difficult of control.

Diet.—During the acute stage all food should be given per rectum; during convalescence the greatest caution is to be observed in feeding, for solids given too soon are likely to provoke hæmorrhage. No solids should be given for at least ten days after the symptoms have subsided. At first the patient may have peptonized milk or kumyss, a drachm every half hour, then beef juice may be allowed; also whites of eggs and infant foods, broths and gruels. Gradually may be added the various semi-solids, junket, cereals, etc., and so on till the patient is strong enough to tolerate solid diet.

The nursing of yellow fever requires no other instructions than those given in the chapter on fever nursing in general.

Influenza.

Synonyms.—Epidemic Catarrhal Fever; La Grippe.

Definition.—An epidemic febrile disease characterized by catarrhal inflammations of the various mucous

membranes, prostration, and a tendency to involvement of the digestive and nervous systems. Influenza occurs from time to time in wide-spread epidemics.

Causation.—The disease is more common and severe in adults than in children, and though it prevails at all seasons, it is more fatal in the colder months. Bad sanitary surroundings do not seem to affect its incidence, and persons who have suffered from the disease seem more prone to contract it than others. The specific cause is a bacillus which is found in the exudations from the inflamed mucous membranes (especially in the nasal discharge and sputum) and in the blood.

Course and Symptoms.—The incubation period is from a few hours to several days; the onset is sudden, with a chill followed by a rise in temperature (101° to 104° F.—38.4° to 40° C.), severe headache, and muscular pains; there may be nausea and vomiting, together with the other symptoms usual in commencing febrile disease. The fever lasts from two to six days and may be of remittent or intermittent type; the pulse is rapid, and in old persons may be feeble. During the course of the disease various skin eruptions may appear. As the temperature approaches normal, sweating is likely to occur, and the symptoms then gradually subside.

The disease manifests itself in one of three main types, which are very likely to merge into one another.

The Catarrhal Type is characterized by symptoms referable to the mucous membranes of the respiratory tract and conjunctivæ. There are sneezing, nasal dis-

charge, a feeling of fulness in the head, sore-throat, and hoarseness, and the eyes are congested. The cough is at first dry, but soon muco-purulent sputum appears; rarely it may be blood-stained. Bronchitis and pneumonia of severe form are not infrequent complications. Recovery is slow, and the cough may persist for weeks.

The Nervous Type begins with severe headache, ringing in the ears, general muscular pains, and extreme depression and prostration; rarely convulsions occur. In some cases there are symptoms resembling those of meningitis, such as sensitiveness to light and sound, pain in the back of the head, and stiffness of the muscles of the neck. Delirium sometimes is seen. The nervous symptoms gradually subside in the course of a few days, but during convalescence there is a marked tendency to mental depression and neuralgia in various parts of the body. True neuritis is a frequent sequel.

The Gastro-intestinal Type is evidenced by vomiting, cramps in the abdomen, distention and diarrhœa; the symptoms may be so severe as to suggest peritonitis or appendicitis. Jaundice may be present.

Complications.—The most common of these are bronchitis, pneumonia, which is usually of severe character, and neuritis. Various other complications, such as pleurisy, inflammations of the heart and pericardium, conjunctivitis and otitis, are less frequent.

Influenza in old persons or those previously weakened by disease is always serious and often fatal.

Prevention.—During epidemics it is wise to avoid undue exposure to cold and wet, and to keep the body in as hygienic a condition as possible. If there is any tendency to nasal or throat inflammation the daily use of an antiseptic spray is advisable.

Quarantine of patients suffering from the disease is hardly necessary, but all needless association with sufferers is to be avoided.

Treatment.—At the onset the patient should go to bed, and an attempt may be made to shorten the disease by means of free opening of the bowels and the induction of sweating by the administration of a hot pack and hot drinks.

If the disease continues despite these measures, treatment calculated to relieve the symptoms should be undertaken. The pains may be controlled by hot or cold applications and the administration of acetphenetidin (phenacetin) when ordered by the physician; the nose and throat inflammations should be treated with antiseptic sprays or applications. In cases with marked prostration heavy stimulation may be necessary.

The Diet during the febrile stage should be of fluids, and it is very important that the patient's nutrition be maintained. As convalescence begins, semi-solids may be allowed, with solids to follow as soon as they are tolerated; the patient should be encouraged to eat as much as he can assimilate. Various tonics such as malt extracts, fat emulsions, and cod-liver oil are useful at this juncture.

In nursing there need be no departure from the usual principles.

Malta Fever.

Synonyms.—Mediterranean Fever; Neapolitan Fever; Rock Fever; Undulant Fever.

Definition.—An infectious fever characterized by an irregular temperature, sweats, diffuse pains, and a tendency to relapse.

Causation.—The disease is endemic in Malta, and epidemics occur from time to time in the countries bordering on the Mediterranean; it is occasionally seen in tropical America. It attacks young adults most frequently and prevails chiefly in summer and under unhygienic environments. Its specific cause is the *bacillus melitensis,* which is believed to enter the body in the inspired air.

Course and Symptoms.—The incubation period lasts from a few days to two weeks. The invasion is slow, with headache, restlessness, prostration, constipation, and sometimes bloody stools. The temperature becomes elevated and the spleen enlarged. The temperature, after remaining high for from one to four weeks, falls to normal and remains there for a period of from one to three days, when a relapse, often of a more severe character than the first attack, takes place. The symptoms are increased in severity, the temperature, though intermittent, is high, and there may be delirium and diarrhœa. These symptoms may last five or six weeks. A second temporary convales-

cence is followed by a second relapse, in which severe joint pains are usually present. After the second relapse the patient may go on to recovery, or a third relapse may ensue after an afebrile period lasting several months. The mortality is not great, death when it takes place being due to the continued high temperature or to exhaustion.

Complications.—Broncho-pneumonia and pleurisy sometimes occur; arthritis and orchitis are more rare.

Prevention consists in avoidance of the localities in which the disease prevails. So far as we are at present aware, little else can be done in this regard.

Treatment is stimulative and supportive. High temperature may be controlled by bathing, the joint pains by applications of heat or cold.

Diet.—The diet applicable to typhoid fever is suitable in this disease.

The nursing is to be carried out along the usual lines.

Mountain Fever.

Synonyms.—Spotted Fever; Tick Fever.

Definition.—An acute infectious disease characterized by a typical skin eruption, recurring chills, and high fever.

Causation.—The disease occurs in the Rocky Mountain regions of Idaho and Montana. It attacks all ages and both sexes, and is most frequently observed during the months from March to July. Its specific cause is a microörganism resembling that of malaria, which is conveyed to the patient through the bite of a

certain form of tick. This organism exists in moderate numbers in the blood of patients suffering from the disease.

Course and Symptoms.—The period of incubation is from three to ten days. The period of invasion is marked by malaise; the onset by a distinct chill (which recurs at intervals during the disease, though decreasing in severity), headache, pains in the bones, and prostration. The initial chill is followed by a rapid rise in temperature, which by the second day reaches 103° or 104° F. (39.5° to 40° C.). It gradually increases to a maximum of 105° to 107° F. (40.5° to 41.6° C.), from the fifth to the seventh day. The temperature is highest at night, being slightly lower in the morning. About the middle of the second week the fever begins to fall by lysis, reaching normal on the fourteenth day. In fatal cases the temperature may fall to normal, or below, a few hours before death. The bowels are usually constipated; there is often a bronchial cough. The tongue and facial expression resemble those of typhoid fever, and in severe types of the infection nervous symptoms resembling those of that disease are to be expected.

The pulse at the onset is full and strong, becoming rapid and weak as the severity of the disease increases. The appetite during the first week of the disease is often good. At the beginning of the second week nausea and vomiting appear and in fatal cases may continue. The spleen is enlarged. The respiration is rapid and regular, but shallow. It may reach 60 but is usually about 40.

As a rule the prognosis is good, with proper care.

The eruption appears on the second to the fifth day, first upon the wrists, ankles or back. Thence it spreads, covering the whole body. It may progress so rapidly as to cover all the skin in twelve hours, but usually the height of the eruption is reached in one or two days. The rash is frequently present upon the scalp, palms and soles. It at first consists of rose-colored, circular spots, from the size of a pinhead (two to four millimetres) to that of a small pea. They are not elevated and in the beginning disappear on pressure; they may be tender to the touch. They quickly become permanent and dark-blue or purplish in color, and they increase in size until the skin assumes a marbled appearance. Sometimes the eruption consists of small brownish spots which give a speckled appearance to the skin.

Desquamation begins during the third week, and as the fever falls the spots fade, but may not wholly disappear for weeks or months. There is usually jaundice. The skin may become gangrenous over the elbows, fingers, toes or scrotum.

Prevention.—The districts in which the disease occurs should be avoided during those months in which mountain fever is prevalent. Measures should be taken to avoid tick-bites, but when these are received the insect should be removed at once by the application of turpentine, ammonia or kerosene, and the wound cauterized with pure phenol (carbolic acid).

Treatment.—The use of quinine in large doses

hypodermically has given favorable results in the few cases in which it has been employed. Otherwise the treatment of the disease is purely symptomatic.

The Diet and nursing suitable to typhoid fever may be employed with advantage in mountain fever.

Acute Miliary Tuberculosis.

Synonyms.—Acute Tuberculosis: Acute General Tuberculosis.

Definition.—An acute febrile disease characterized by the formation of miliary tubercles in various organs of the body and accompanied by constitutional symptoms closely resembling those of typhoid fever.

Causation.—Acute tuberculosis may follow localized tuberculosis of the lungs, bones, joints or glands, or occur in individuals in whom tuberculosis in any form has not been previously recognized; although it is probable that these patients have had undemonstrated tuberculosis of some organ or tissue. The specific cause of the disease is the tubercle bacillus, which in some manner has entered the circulating blood in considerable number and has been deposited in the various organs by means of this medium.

Course and Symptoms.—The disease resembles typhoid fever to so marked an extent that differentiation may be very difficult. The onset is slow, with increasing weakness, headache, nausea, constipation and fever. The temperature is irregular, being low in the morning and high at night (102° to 105° F.—38.9°

to 40.5° C.), and is accompanied by sweating; the pulse is rapid (140 to 150) and the respirations are accelerated (36 to 70); there may be blueness of the lips and extremities. Cough is usually present; the sputum is scanty and mucoid, and may or not contain the bacilli. Fever sores upon the lips are not rare. Otherwise the symptoms so resemble those of typhoid fever as to need no further description in a work of this character. The disease is invariably fatal.

Varieties.—There are several varieties of the infection:

(*a*) *The Typhoid Type,* in which many of the nervous symptoms of typhoid fever are present.

(*b*) *The Menningeal Type,* in which there are hyper-sensitiveness of all the senses, convulsions, stiffness and pain in the back of the neck, and finally coma with paralyses.

(*c*) *The Pulmonary Type,* which is characterized by distressing cough, extreme shortness of breath, and blueness of the lips and extremities.

(*d*) *The Abdominal Type,* in which there are distention and tenderness of the abdomen.

Treatment is entirely symptomatic. The high fever may be controlled by bathing, the heart-weakness combated by stimulants, and the cough and nervous symptoms relieved by sedatives. Otherwise the treatment of the symptoms of typhoid fever is applicable.

The Diet and nursing should also be based upon the principles already described for typhoid fever.

Chronic Pulmonary Tuberculosis.

Synonyms.—Chronic Phthisis; Consumption.

Definition.—A chronic disease characterized by progressive emaciation, obstinate cough with the expectoration of muco-purulent matter and sometimes of blood, fever and night-sweats.

Causation.—The disease is predisposed to by an hereditary tendency, by unhygienic methods of life, and by unhealthful surroundings. Its specific cause is the tubercle bacillus, which reaches, either through the blood stream or upon the inspired air, the interior of the lungs and there causes a tuberculous inflammation.

Course and Symptoms.—Sometimes the disease gives few recognized symptoms until the inflammation in the lungs has made considerable progress, but usually the patient becomes aware that his condition is not as it should be by the appearance of persistent cough, of pulmonary hæmorrhage, of progressive loss of flesh and strength, of chilly and feverish feelings, or of night-sweats.

The temperature of the disease is not constant; it may remain normal for considerable periods, but usually it shows a remittent curve, being about 100° F. (37.8° C.) in the morning and rising in the afternoon to 102° or 103° F. (38.9° to 39.5° C.); with the fever there are chills and sweats, clammy perspiration at night being a feature of the disease.

The pulse is moderately increased in rate, and as the prostration increases becomes progressively more

feeble; both pulse and respiration are quickened by slight exertion. Usually the respiration, even when quiet, is faster than normal, but the patient seldom complains of shortness of breath.

As the disease goes on the patient gradually loses flesh, his cheeks become sunken and flushed (the "hectic flush"); the color of the skin is otherwise pale or it may be bluish over the extremities; the spaces above and below the clavicles are sunken, the ribs are prominent, and the abdomen hollowed.

The appetite is poor, the tongue is coated, and there may be nausea and vomiting caused by the swallowed sputum. Late in the disease there is likely to be diarrhœa, due to a complicating tuberculous inflammation of the intestinal lining.

The cough may be dry, or there may be muco-purulent sputum in greater or less amount. A considerable quantity of purulent sputum may be raised upon the occasion of the rupture of an abscess in the tissues of the lung. The sputum may be streaked with blood and at times hæmorrhages may take place, not rarely so profuse as to end in death. The sputum contains the tubercle bacilli in greater or less number.

There may be pain in the chest due to a complicating pleurisy.

Tuberculous laryngitis, accompanied by hoarseness, a laryngeal cough, and pain and difficulty in swallowing, is a common complication.

In women menstruation is irregular or stops entirely.

A feature of the disease is the fact that the patient is

cheerful, and no matter how ill he may be is very hopeful of recovery.

Prevention.—Persons with an inherited tuberculous tendency should be careful to avoid exposure to cold and wet, and endeavor to lead as healthful lives as possible.

Since the sputum of this disease contains the tubercle bacilli, the greatest care should be exercised in its disposal. Indoors, it should always be expectorated into paper cups, which may afterward be burned, or into vessels containing a disinfectant solution (1 to 10 phenol (carbolic acid) solution or 1 to 2000 mercury bichloride), and when the patient is out of doors he should be provided with an appropriate pocket flask. If cloths should be used they must be burned as soon as possible. Great care should be taken by the patient to prevent the hands, face and clothing from becoming contaminated by the matter coughed up. If they do become soiled they should be washed at once with soap and hot water. By coughing or sneezing, particles of moisture are expelled which may contain the bacilli; consequently a cloth, which must subsequently be burned, should be held before the mouth during these acts. Male patients should always keep the face cleanly shaven.

All the patient's personal and bed linen should be handled as little as possible when soiled, and should be placed in water until ready for washing. His apartment should be subjected to periodical disinfection by one of the usual methods.

When the patient is too weak to properly dispose of his sputum, all utensils and clothing which become contaminated must be cared for as described in the chapter upon disinfection, and rooms which have been occupied by tuberculous patients should be fumigated by the processes usual after the infectious diseases.

The stools of patients with tuberculous disease of the intestine may also contain the bacillus, and these, as well as all articles contaminated by them, should be disposed of as set forth in Chapter IV.

Attendants should avoid standing in front of the patient when he coughs, for minute particles of sputum containing the bacilli may by this act be projected into the atmosphere and infect those with whom they come into contact.

Treatment.—The main object in the treatment of this disease is to improve the general nutrition. The patient's apartment should be large, airy, and sunny, and without carpet or draperies. He should spend as much time as possible in the outdoor air (if possible living and sleeping there) ; in bad weather being properly sheltered and wrapped during his airing. At night the room should be freely ventilated, no matter how cold the weather; but avoidance of draughts is necessary. He must be well supplied with extra-warm clothing and blankets.

Exercise in moderation, but not when it tires the patient nor when fever is present, may be indulged in. When the disease is advancing rapidly, when there is marked fever, and when complications arise, he should be kept in bed.

When in the open air the patient should periodically draw several long breaths through the nose, so as to thoroughly aërate the lungs. A sponge bath with water at a moderate temperature should be given daily. The underclothing should be of wool and of moderate weight. Pajamas of flannel are to be preferred to the ordinary night gown.

The drugs most used in the treatment of this disease are cod-liver oil and creosote or some of its derivatives. Creosote is frequently given by inhalations from a mask made of perforated metal, which may be worn as long as desired. The appliance contains a sponge which is moistened with a mixture of equal parts of creosote, chloroform and alcohol. Tonics are often useful.

The night-sweats may be controlled by the administration of various drugs, or by waking the patient about four o'clock in the morning and giving him a glass of warm milk containing a little whiskey. This procedure possesses the additional benefit of supplying a little extra food.

If the sputum is foul the inhalation of the vapor of a few drachms of turpentine added to a kettle of steaming water is beneficial.

Pulmonary hæmorrhage should be treated by insisting upon absolute quiet in bed and the application of an ice-bag to the chest.

The internal administration of calcium chloride and suprarenal extract and subcutaneous injections of gelatin solution have been advocated. No medica-

tion, however, should be administered unless ordered by the physician.

For patients able to travel a change of climate is frequently beneficial. A climate which agrees with the patient should be chosen. Some do best upon the seashore, others at high altitudes. There is no way of determining in advance whether or not a certain climate will prove beneficial.

The Diet in chronic phthisis is a most important consideration. The secret of feeding tuberculous patients is to give them light, nutritious, easily digested food, and to feed them early and often. The patient should have at least three hours in which to digest the heavier meals, so that the stomach may be emptied before the next feeding. About seven o'clock in the morning he should be given a glass of warm milk containing a tablespoonful of strong French coffee. If the previous night has been an exhausting one, whiskey may be substituted for the coffee. Before being added to the milk, the spirit should be diluted with an ounce of water, lest it cause coagulation and render the mixture indigestible. Breakfast should be taken about nine o'clock, and may consist of eggs cooked in any way except by frying. If the patient insists upon having fried eggs, olive oil or butter must be used instead of lard. Bread, toast or cold rolls with butter, milk and coffee may complete the meal.

About eleven o'clock the patient is to receive a second breakfast consisting of a cup of cocoa from which the fat has been extracted, or coffee, with bread and a little

soup or beef extract. An eggnog is permissible and kumyss or matzoon is often acceptable.

The dinner should be served about one o'clock and may include any kind of fresh meat, though this must not be fried. Potatoes, fresh vegetables, fruits and puddings may also be allowed. Coffee, tea or possibly a bottle of light beer may be added.

About four in the afternoon the patient should take a little meat-extract with toast, and about five o'clock a little more should be given. About seven o'clock in the evening comes supper, consisting chiefly of farinaceous food, with the addition of various jellies, beef extracts and gruels. If the patient is awake at eleven, a cup of milk, hot soup, or gruel may induce sleep.

Patients, whose temperature rises in the afternoon should usually take no alcohol after the one o'clock meal. In other cases the only alcohol permissible in the afternoon is light beer, or possibly stout at bed time.

Especially in patients with complicating tuberculous laryngitis, and in others when indicated, forced feeding by gavage (Debove) accomplishes good results. For this procedure the food is prepared as follows: Lean meat from which all the gristle and tendon and much of the fat have been removed should be used. The meat should be chopped fine and dried in an oven at 150° F. (65.6° C.). To insure absolute dryness the temperature of the oven is then gradually raised to about 170° F. (76.7° C.). When the meat has thus been thoroughly dried, which takes a number of hours,

it should be ground in a mortar and sifted. Six pounds of raw beef treated in this way furnish about one pound of the beef powder. In administering the food a stomach tube (not a stomach pump) is used. This tube should be of soft rubber, of three-eighths to one-half an inch outside diameter, and with an opening both at the side and at the extremity of its tip; a glass funnel should be attached to the other extremity. At about sixteen inches from the tip of the tube there should be a mark, so that we may know when the stomach has been reached.

Before passing the tube it should be lubricated by pouring upon it a few drops of glycerin, which should be allowed to run down its outside to the tip. Then, grasping the appliance between thumb and forefinger at about six inches from its tip, the nurse should stand directly in front of the patient, and as the mouth is opened pass the tube along the dorsum of the tongue. When the tip reaches the back of the throat the nurse should rotate it and tell the patient to swallow. As he does this the tube should be quickly and gently passed down the œsophagus until it reaches the cardiac end of the stomach; as the tube passes this point a distinct sensation is perceived by the nurse. Care should be taken that the appliance is not passed into the trachea, instead of into the œsophagus. If this accident happens air will be breathed through the tube, and the patient will experience difficulty in respiration. In the event of such an occurrence there is nothing to do but to withdraw the tube and begin over again. In pa-

tients with very sensitive throats it may be necessary to employ a spray of cocaine solution (four per cent.) or to administer bromides before the procedure.

The tube being in the stomach, the organ should be washed, in order to cleanse its walls of mucus, by pouring in a pint of artificial Vichy water. After washing, the Vichy should be withdrawn by lowering the funnel, when the wash water will flow out by siphonage. The stomach having been washed, the nurse should proceed with the feeding of the patient by pouring into the organ through the tube three-quarters of a pound of the beef powder, to which has been added three times as much milk (two-and-one-fourth pints). This is to be left in the stomach. At first such a meal should be given twice a day, and the amount then gradually increased until the patient takes from one to one-and-one-half pounds of the powder and four or five pints of milk per day. If there is trouble in digesting this, the milk should be omitted and a little diluted hydrochloric acid added to the meat powder. In no case should the hydrochloric acid be used if milk forms a part of the feeding.

In the late stages of chronic phthisis, when the patient's digestion will not permit the administration of solid food and weakness forbids feeding by gavage, we must have recourse to a diet consisting of milk, soups, gruels and the like.

The nursing in other respects is to be conducted as usual in febrile diseases.

CHAPTER VI.

INFECTIONS OF CONTINUED TYPE WITH LOCAL MANIFESTATIONS.

Pneumonia: Diphtheria: False Diphtheria: Acute Articular Rheumatism: Erysipelas: Septicæmia: Puerperal Fever: Pyæmia: Mumps: Bubonic Plague.

Pneumonia.

Synonyms.—Pneumonitis; Fibrinous Pneumonia; Croupous Pneumonia; Lung Fever.

Definition.—Pneumonia is an acute infectious fever characterized by inflammation of the lungs.

Causation.—The disease is common in all countries and occurs at all ages; it is particularly fatal in infancy, old age, and alcoholic subjects. It is most frequently seen in the cold and damp months. Exposure to cold and wet, alcoholic excess, previous catarrhal affections of the lungs, and disease of the heart predispose to the infection. During epidemics of influenza pneumonia is likely to be prevalent and attended with an increased mortality. Several attacks in the same person are not infrequent.

Various bacteria are found in the sputa of pneumonia patients, the most common of which are the *micrococcus lanceolatus,* or diplococcus of Fränkel, the *bacillus pneumoniæ* of Friedländer, and ordinary *staphylococci* and *streptococci.* It is probable that pneumonia is in a sense infectious, for although physicians

and nurses seldom contract the disease from association with patients, it is not uncommon for several cases to occur in the same house or to develop in a hospital ward after the admission of a patient suffering from the infection. The sputum probably is the means through which the contagium is carried.

Course and Symptoms.—The incubation period is unknown, but in all probability is from a few hours to three days. The onset as a rule is sudden, with a marked chill followed by a rapid rise in temperature, sharp pain in the side, cough and shortness of breath; the pulse is rapid and tense; there is extreme prostration. A frequent early symptom is herpes of the lips or nostrils. The cough is at first dry, but after two or three days a blood-stained expectoration appears (the so-called "rusty sputum"), which is so viscid that it adheres firmly to the sides of the containing vessel; in certain cases the sputum is not so viscid and presents a dark brown color—"prune juice sputum." After the temperature has fallen the sputum becomes lumpy and yellowish or greenish in color. The pain in the chest is severe and knife-like in character, is usually felt in the axilla over the affected lung, and is increased upon breathing or coughing. It tends to become less marked as the disease progresses. The patient is likely to be more comfortable when lying upon the affected side, because in this position less motion of the involved lung is possible.

The pulse is rapid and full at the onset of the disease, but not so rapid as to retain the normal pulse-

respiration ratio; later it becomes weaker, irregular and perhaps dicrotic. There is always danger of heart-failure.

The shortness of breath is a prominent symptom, and may be accompanied, especially in children, by movement of the nostrils. The respirations are shallow and from thirty to fifty per minute—in children even more rapid. In some cases expiration is accompanied by a grunting sound. Blueness of the lips and extremities may be present, with extreme respiratory difficulty. Nervous symptoms such as stupor and delirium are common. In alcoholic subjects delirium tremens is a frequent complication.

The temperature reaches its highest point within a few hours after the onset and remains elevated, with slight morning remissions, until the crisis, which usually takes place upon the seventh day, when it falls within a few hours to normal. With this occurrence the other symptoms abate. In children and old persons defervescence is more likely to take place by lysis, as is also the rule in cases protracted beyond the tenth day.

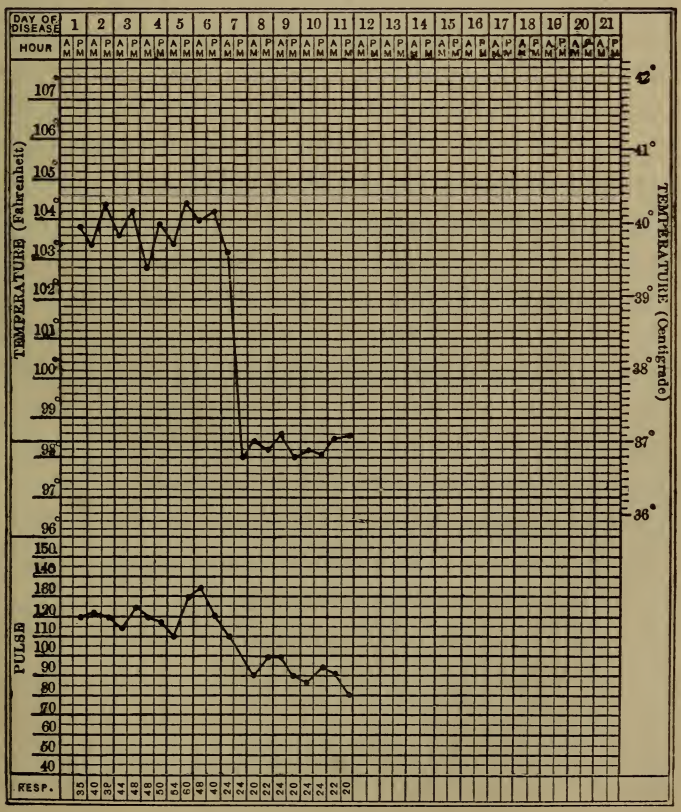
Complications.—*A dry pleurisy* accompanies all cases of pneumonia in which the inflammation extends to the surface of the lung. *Pleurisy with effusion* is not infrequent, and may, especially in children, go on to *empyema;* in which latter case chills, sweating and a remittent temperature should lead us to suspect the presence of pus.

Bronchitis may make the disease more severe and increase its exhausting effects.

Pericarditis may occur and is due to an extension of the inflammation to the membranes surrounding the heart.

Endocarditis is not rare.

Jaundice may occur, especially in alcoholic subjects. With this complication the sputum may be tinged yellow or green.



CLINICAL CHART OF ACUTE PNEUMONIA showing pulse and respiration. Defervescence upon the seventh day of the disease.

Meningitis may exist as a complication, and is evidenced by headache, stiffness of the neck, unequal pupils, and stupor or delirium.

Varieties of the Disease.—*Wandering Pneumonia* is the term applied to that variety of the disease in which different areas in the lungs become successively inflamed.

Typhoid Pneumonia has no connection with typhoid fever, but is the term applied to that type of the disease in which the patient is rapidly overcome by the toxæmia. The temperature may remain low, or it may reach a high level. The nervous symptoms are marked and the tendency to heart failure is great.

Alcoholic Pneumonia occurs in individuals who use liquor to excess. It is typified by a severe course and a tendency to delirium tremens. It is very fatal.

Pneumonia in Infants.—The onset may be marked by a convulsion. The temperature is irregular and usually falls by lysis. The mental symptoms are severe and, though there may be cough, there is usually no expectoration, since if it be present at all it is apt to be swallowed.

Pneumonia in Old Persons is characterized by a protracted course and moderate temperature, which as a rule falls by lysis; the prostration is extreme, the pulse is weak, the respiration shallow. This variety is usually fatal.

Prevention.—All sputum should be disinfected, and after the disease is over the sick-room should be fumigated after the usual manner.

Treatment.—The patient should be kept in bed and absolutely quiet, in a well-ventilated room at a temperature of about 70° F. (21.1° C.). He should not be allowed to rise or to lift his head under any circumstances. The bowels should be kept open throughout the course of the disease.

A pneumonia jacket of cotton batting and oiled silk, fitted to the chest, may make the patient more comfortable. Poultices or ice-bags applied to the inflamed lung do not influence the disease, but may relieve pain. The former may be made of kaolin cataplasm or flaxseed. The official kaolin cataplasm may be used by applying several turns of a three- or four-inch roller bandage to the chest, spreading the substance (previously made hot in its container, care being taken that no water has gained access to it) in a thin layer upon that portion of the bandage which covers the affected portion of lung, and covering it with further turns of the bandage.

A flex-seed poultice is made as follows: Bring a saucepan of water to the boiling point, and, without removing it from the fire, stir into it the meal little by little, until it has the proper consistency—about thick enough to be cut easily with a knife; cook well and beat thoroughly until very light. The material thus prepared should be spread evenly, about one-fourth of an inch thick, upon a piece of muslin, previously cut to the desired size, leaving an inch or more of margin on three sides, and one end long enough to fold back as a cover, to be tucked over the end of the poultice.

The poultice should be carried to the patient between two hot plates, or on a board covered with a dish. It should be applied hot and covered with a piece of flannel or layer of cotton. Great care must be taken not to burn the patient. In renewing poultices it must be remembered that a surface to which continuous hot applications have been made will not bear a poultice so hot as that first applied. If the poultice cannot be applied immediately after it has been made it should be kept warm between two plates placed over a vessel of boiling water, *not* in the oven.

The fever may be controlled by sponging with alcohol and water, and a luke-warm tub bath is an excellent measure in the case of children.

Few drugs have any influence upon the course of the disease. The use of creosote carbonate, however, is frequently followed by beneficial results. It should be given only upon the physician's order. We endeavor to keep the pulse between ninety and one hundred, and of good strength. If this is done the respiration will be easier and the tendency to cyanosis diminished. The drugs best suited to this purpose are alcohol and other cardiac stimulants. When the dyspnœa is marked and the blueness of the lips and extremities extreme, the administration of oxygen is valuable. It may be given continuously or at intervals, and in cases which it does not benefit it certainly does no harm.

Treatment other than that described above should be calculated to relieve the various symptoms as they arise.

After convalescence has begun the patient should be kept in bed for a week and given general tonic treatment.

The Diet during the febrile stage should be entirely of fluids—milk, broths, gruels, etc., and should be administered either through a tube or by means of a cup with a spout adapted to the purpose.

The nurse should above all things be quiet and carefully observant of the slightest changes in the patient's condition. In this disease, as in few others, thoroughly efficient nursing is absolutely necessary.

Diphtheria.

Synonym.—Putrid Sore-throat.

Definition.—Diphtheria is an acute infectious febrile disease, occurring sporadically and as an epidemic, and marked by inflammation, with the formation of a false membrane, in the upper air passages.

Causation.—It occurs chiefly in children, is rare after sixteen years of age, and is most common in the colder months. The disease is predisposed to by the presence of adenoids and enlarged tonsils. It is of most frequent occurrence in unsanitary surroundings, in consequence of the fact that these cause general ill-health and lessen the resisting power of the body. The specific cause of the infection is the Klebs-Loeffler bacillus, which grows in the false membrane. The bacilli enter in the inspired air, upon substances conveyed to the mouth, or by direct contact with an abraded surface; they are not borne upon sewer-gas

or emanations from unclean drains, etc. The disease is very contagious for the distance of a few feet, but its poison is not very diffusible; consequently it is quite possible to confine it to a single room. The contagium may be carried long distances in clothing, etc., and may be transmitted by pet animals—cats in particular. Certain persons seem to be insusceptible to the infection, for the bacilli have been found in the throats of healthy individuals. Pieces of membrane coughed up by patients may infect physicians or nurses or be carried by them to a third person. In most cases the ordinary pus germs are found to co-exist with the Klebs-Loeffler bacilli. One attack seems to render the individual more susceptible to subsequent infection.

Course and Symptoms.—The incubation period is usually from two to three days, rarely as long as a week; the onset is marked by chills or convulsions, followed by a rise in temperature to 100° or 102° F. (37.8° to 38.9° C.); rarely, fever may be absent throughout the whole course of the disease. The throat is sore, swallowing is painful, and hoarseness due to laryngitis may be present; there are headache, pains in various other parts of the body, nausea, vomiting and prostration; the tongue is coated and the breath foul. The severity of the symptoms is usually in proportion to the extent of the local inflammation. The pulse is rapid and, throughout the disease as well as during convalescence, there is great danger of heart-failure, which may be either very sud-

den or gradual in its onset. Shortness of breath is common as a result of obstruction of the air-passages. The urine is scanty and high-colored, and often contains albumin and casts.

The Malignant Variety.—Cases of this type appear during every epidemic, usually in individuals whose condition is poor. Such cases are marked by prostration so severe that death may take place before the membrane appears; in other cases the membrane forms very rapidly. The febrile movement is absent, and there are extreme prostration and heart-weakness. The patient may become delirious or comatose, and death may supervene within a few days.

The membrane may appear in any of the following situations:

The Pharynx and Tonsils.—The tonsils and pharynx are red and swollen. Upon them are one or two small, grayish, membrane-like patches, which rapidly increase in size; the uvula becomes inflamed and sometimes œdematous; the glands in the neck become enlarged, but not tender. The membrane spreads over the back of the throat and is grayish or yellowish in color; after about seven days it begins to disappear, and within a few days is entirely gone. With its disappearance the symptoms clear and convalescence begins.

The Larynx.—When this part is involved the constitutional symptoms are similar to those described, with the addition of marked hoarseness, noisy breathing, and a croupy cough. In some cases the voice may be lost, and as the membrane spreads the difficulty in

breathing becomes extreme; the lips grow blue, and the patient's expression very anxious. Bits of membrane may be coughed up, but usually this gives no permanent relief, for new membrane soon forms. In severe cases of this type all the symptoms become accentuated, lung complications may occur, and death is not unusual.

The Nose.—In nasal diphtheria there is a thin and sometimes very irritating discharge from the nostrils, which soon becomes brownish in color and may contain blood; the patient snuffles, sneezes and, if the nose is entirely occluded, breathes through the mouth. The inflammation may extend to the ears and eyes; the glands beneath the jaw are swollen. This type varies in severity, but as a rule is to be dreaded.

The membrane may involve any two or all of the above situations.

Complications.—*Heart-failure* is not rare and may cause the sudden death of the patient. Therefore the patient must not be allowed to sit up, to struggle, or to make any unnecessary exertion until convalescence has been thoroughly established.

Nephritis of mild or severe character is not uncommon.

Pneumonia due to the inhalation of bits of membrane may occur.

Paralyses are frequent sequels of diphtheria, and may appear even late in convalescence. They most usually affect the motor nerves supplying the muscles of the palate, the eye, the vocal cords, or the limbs. Such paralyses are seldom permanent.

The diagnosis of the disease in poorly marked cases may be impossible without bacteriological examination; consequently it is advisable that the nurse should be familiar with the technique of taking cultures from the throat. A culture outfit, consisting of a tube of solidified blood serum and a swab encased in a sterile tube, is furnished for this purpose by the health boards of many cities. The patient should be placed in a good light and, if a child, firmly held. The swab should be rubbed against the suspicious area in the nose or throat by revolving it between the finger and thumb; then, care being taken that it does not come into contact with anything else, it should be gently rubbed over the surface of the serum in the culture tube; care should also be taken not to break the surface of the serum. The swab should then be returned to its tube, and both tubes stoppered with their cotton plugs. The culture is placed in an incubator for some hours, and finally examined microscopically. Throat cultures should not be taken directly after antiseptic applications have been made to the inflamed surface.

Preparation of a Room for a Patient Suffering from a Contagious Disease.—A bright sunny room, or two if possible, should be chosen at the top of the house, communicating with or near to a bath-room. Before removing the patient to the room, the nurse should prepare as follows: Remove all carpets, rugs, draperies, upholstered furniture, and pictures; retaining only the plainest and most necessary furniture. The following articles should be taken to the room:

Bedding (oldest), foot-tub for soaking clothes and bedding, bed-pan, commode and all other utensils for the sick, dishes, table linen, silver, dish-pan, clothing for patient and nurse, gowns, caps, and rubbers for physician or visitors, dust-pan, paper bags, pail, scrubbing-brush, floor-cloths, gauze, soap, disinfectants, some kind of lubricant, mouth-wash, mouth-swabs, saucepan, gas stove or chafing dish. When the patient is taken to the isolation room the nurse should remove with him the bedding, clothes, etc., which have been in use and are already infected.

The general care of the patient while in isolation is as follows: The nurse should thoroughly wash and disinfect her hands whenever she touches the patient or his bed, disinfect all linen, utensils, and secretions, keep the room clean, well ventilated, and the patient out of draughts, give the patient a daily bath and lubricate the skin, and see that his bowels move daily and that the normal amount of urine is voided. Fluids are to be given until otherwise ordered, and the mouth, teeth and tongue should be cleansed before and after each feeding. All dust and waste are to be put into paper bags and sent to be burned. The nurse must not allow flowers to be brought to the room, nor send anything from the room that has not been thoroughly disinfected; she must keep the door closed and not talk to persons outside with the door open. She should endeavor to take a daily walk, but should not wear anything on the outside which has been in the sick-room.

Prevention.—Since we know the cause of diph-

theria and its mode of transmission, we should be able to do much to prevent its spread. The following is a condensation of the rules concerning the disease laid down by the New York Health Department:

If possible, one person should take entire charge of the patient and no one else except the physician should be allowed in the sick-room. The nurse should hold no communication with the rest of the family, who should not receive or make visits during the illness. Discharges from nose and mouth must be received on cloths which should be immediately immersed in carbolic acid solution (six ounces of pure phenol—carbolic acid—added to one gallon of hot water and this diluted with an equal quantity of water). All handkerchiefs, towels, bed linen, clothing, etc., that have come in contact with the patient, must after use be at once immersed, without removal from the room, in the above solution. They should be soaked for two or three hours, and then boiled in water for one hour.

The greatest care should be taken in making applications to the throat and nose, lest the discharges be coughed into the face or upon the clothing of the attendant.

The hands of the attendant should always be disinfected, by washing in the phenol solution and in soapsuds, after making applications and before eating.

Surfaces of any kind soiled by discharges should be immediately flooded with phenol solution.

All utensils used by the patient must be kept for his use alone; they must not be removed from the room,

but there washed in the phenol solution and in hot soapsuds. After use, the soapsuds should be thrown in the water-closet and the vessel which contained them washed in the phenol solution.

The sick-room should be thoroughly aired two or three times a day and frequently swept, after scattering wet sawdust on the floor to prevent the dust from rising. After sweeping, the room should be dusted with damp cloths. The sweepings should be burned and the cloths soaked in the phenol solution.

When the disease is recognized shortly after the beginning of the illness, all hangings and unnecessary furniture should be removed from the sick-room.

After recovery, the patient's body and hair should be washed with hot soapsuds, and he should be dressed in clean clothes, which have not been in the room during the illness, before being taken from the apartment.

The quarantine should last as long as the diphtheria bacilli are found upon the mucous membranes; they may persist for six or eight weeks.

The nurse and physician should wear, while in the sick-room, a gown which covers the clothing completely. This should be kept just outside the apartment and sterilized directly after use. If the patient, while the throat is being examined, should cough in the examiner's face, the latter should wash the face and hair in soap and water, followed by 1 to 1000 mercury bichloride solution. The hands must always be sterilized upon leaving the sick-room. The nurse

should spray or gargle her throat several times a day with a mild antiseptic, such as the official antiseptic solution.

It is strongly advisable that the nurse and the members of the family, if they have been exposed, should receive an immunizing dose (100 to 500 or more units) of antitoxin, and at the first sign of sore-throat a full dose must be given. The effect of an immunizing dose lasts from two to four weeks, and at the close of this period a second dose should be given if there is continued exposure.

After removal of the patient the room and its contents should be disinfected and aired in the manner described in Chapter IV.

Treatment.—The patient should be kept in bed during the acute stage of the disease; even in hospitals a separate room for each patient is to be preferred. If the disease is complicated by pneumonia the patient should be isolated under all circumstances. The apartment should be kept cool and freely ventilated.

The treatment of diphtheria by antitoxin is attended with such good results that it is rapidly displacing all forms of drug treatment. The antitoxin, which is a yellowish transparent fluid, should be administered subcutaneously by means of an ordinary hypodermatic syringe which has been properly sterilized. The skin of the site selected for the injection, usually the thigh, the abdomen, or the side of the chest, should be bathed with soap and water and washed off with 1 to 5000 mercury bichloride solution, and as soon as the injec-

tion is made the needle puncture should be covered with a bit of sterile gauze held in place by adhesive plaster. The quantity of antitoxin administered depends upon the age of the patient and the severity of the infection. The initial dose should usually be from 1000 to 2000, or more, units—a unit being the quantity of antitoxin required to neutralize the amount of diphtheria poison necessary to kill one hundred small guinea-pigs.

After the injection there is likely to be a slight local reaction—pain, tenderness, redness or œdema. Various skin eruptions may follow the administration of antitoxin, and these are sometimes accompanied by constitutional symptoms. Most commonly the rash appears upon the buttocks, abdomen or chest; there may be itching and occasionally there is desquamation.

The drugs which seem to influence the disease most are mercury bichloride and the tincture of iron chloride; they, especially the former, must be carefully given. The bowels should be kept open by suppositories of enemata; for the heart-weakness, whiskey and other cardiac stimulants may be necessary.

Local Treatment is an important adjunct to antitoxin, and should be employed even if the patient objects. Older children and adults may use sprays and gargles, but for young children irrigation is necessary. In employing this measure the child should be tightly wrapped in a sheet to prevent struggling, and laid upon a table, with its head low and the mouth directed toward the table edge, so that the fluid may

run out and flow over a rubber sheet adjusted for the purpose, into a pail upon the floor. The irrigation tube is passed into the mouth (in which case the teeth should be kept separated by means of a cork) or the nose; allowing the fluid to return through the nose or the mouth as the case may be. The irrigation should be made with some mild antiseptic solution, which is given lukewarm through a soft catheter attached to a fountain syringe. If the nose is entirely occluded, a passage for the catheter must be made along the floor of the nostril by means of a probe with a swab of cotton wrapped about its extremity.

Irrigation does not reach the membranes in the larynx, and when the disease attacks this situation a tent should be made over the child by means of a blanket, and the tube of a croup-kettle inserted through an aperture. An improvised croup tent may be made by placing a screen or clothes-horse around the head of the bed. Over and around the screen pin blankets, allowing one-half of the top blanket to fall over the front of the screen, thus forming a tent over the head of the patient. Place a croup-kettle, or tea-kettle with a long spout, over a gas stove or alcohol lamp on a table at the head of the bed, where an opening should be left between the blankets just large enough to admit the spout of the kettle. Care must be taken not to have the fire too near the bed. An umbrella may be used for the tent by fastening it to the head of the bed and throwing a blanket over it in such a manner that the sides and back of the bed will be closed in,

while the steam is made to enter at the back. The spout of the kettle should be back of and out of reach of the child's hands. The inhalation of hot steam exerts a very beneficial action upon the inflammation, and a little turpentine or creosote added to the water in the kettle may increase the good effect. A marked laryngeal obstruction may be dislodged by a mild emetic, but this should never be employed in weak patients; in their case the inhalation of calomel vapor may be substituted. This process is accomplished by closing the tent as tightly as possible and directing into it the vapor of ten to thirty grains of calomel burned upon a tin plate over a spirit lamp.

If there is danger of suffocation from laryngeal obstruction, either *intubation* or *tracheotomy* must be performed. The former consists in inserting a specially constructed tube into the larynx by means of an instrument made for the purpose. Attached to the tube is a cord to prevent its being lost in the œsophagus or trachea. When nursing a patient who has been intubated, care must be taken that the tube is not coughed up, and if it should be coughed up, that it does not become lodged in the œsophagus. The nurse should at once replace the tube if the physician is not accessible. When feeding the patient the nurse should raise the foot of the bed, as after intubation it is easier to swallow if the head is lower than the rest of the body. The intubation tube may be worn continuously for several days or extracted at intervals to be cleansed. In some cases it may be necessary to remove it at

feeding time; other patients learn to eat with it in place. While wearing the tube the patient should be kept in a moist atmosphere and must be continuously watched lest the tube become plugged.

Tracheotomy may be necessary if the obstruction extends to the trachea. The operation consists in making an opening into the trachea with a scalpel and inserting a specially constructed tube. After tracheotomy has been performed watch the patient very carefully and keep the opening of the tube covered with a layer of moist gauze to prevent dust, etc., being inhaled. If the patient should choke, remove the inner tube and cleanse with water by means of an applicator wrapped with cotton. If, after the tube is removed, the patient still chokes, pass a rubber catheter down into the trachea and blow through it to dislodge the mucus.

The treatment of the complications is that usually employed in those conditions when they occur in other affections.

The Diet should be chiefly of milk, and it must be given in sufficient quantity—three quarts a day being none too much for an adult. There is much more danger of under- than of over-feeding. Intubated patients can often swallow semi-solids more easily than liquids, and in such cases these may be allowed. In cases where swallowing causes coughing, and in intubated patients, feeding by gavage through the mouth or nose may be necessary. In nasal feeding the patient should either be lying down or sitting up with the

head thrown back. A soft, well-oiled catheter is introduced through the nostril into the œsophagus for about fifteen inches and connected with a small funnel, into which the fluid food is poured. After the tube has been inserted the patient's color should be watched, and if he becomes cyanosed the tube should be withdrawn, as it is probable that it has gone into the trachea. Another accident that may happen, and must be guarded against, is the curling up of the tube in the mouth. When there is any difficulty in inserting the tube, it is well to try the other nostril, which may be larger on account of a deviated septum. When the tube once enters the œsophagus it is helped down by the constrictor muscles. Frequently, especially in intubated patients, feeding is best accomplished while the patient lies upon his back with his head well down.

With regard to points other than those mentioned above the nursing should be conducted according to the ordinary rules.

False Diphtheria.

Synonyms.—Pseudo-Diphtheria; Membranous Croup.

This is a disease which in appearance and symptoms resembles true diphtheria, but differs from it in causation. It may complicate the infectious diseases or occur by itself; the membrane does not show the presence of the Klebs-Loeffler bacillus, but contains the ordinary pus germs (*streptococci* and *staphylococci*). Bacteriological examination is always necessary to dif-

ferentiate the two diseases. False diphtheria is usually milder, shorter, and less likely to be followed by complications.

The treatment, diet and nursing are the same as those applicable to true diphtheria, except that the administration of antitoxin is useless. Also, less strict quarantine and disinfection are required, although the possibility of transmitting the disease from one patient to another is not out of the question.

Acute Articular Rheumatism.

Synonyms.—Inflammatory Rheumatism; Rheumatic Fever.

Definition.—An acute febrile disease, probably infectious, and characterized by inflammation of the joints.

Causation.—A tendency to the disease may be inherited. It occurs chiefly in young adults and is more common in males than in females. It is predisposed to by exposure to cold and wet, and by unhygienic environment and mode of life. The specific germ of rheumatism has not yet been isolated, but it is probable that the disease is of infectious origin.

Course and Symptoms.—The onset of the disease is usually sudden. The temperature rises rapidly and one or more of the joints becomes swollen, painful, reddened, hot and tender. The tongue is coated and the pharynx or tonsils may be inflamed. The joints involved most frequently are the knees, the wrists, the ankles, and the joints of the fingers. It is unusual for

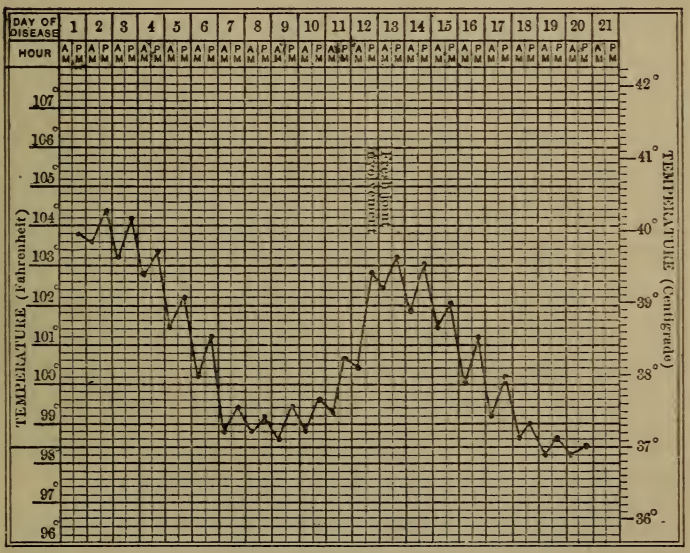
the inflammation to be confined to a single joint, and frequently the process travels from one joint to another, one improving as another becomes affected. Sweating is a prominent feature of the disease. The reaction of the perspiration, as well as that of the saliva, is acid. The temperature ranges from 100° to 104° F. (37.8° to 40° C.). The symptoms, unless the disease is treated, continue from one to three weeks —then gradually ameliorate. Relapses are frequent. When the inflammation proceeds from one joint to another the temperature rises, and the symptoms recur as fresh involvement takes place.

Complications.—Hyperpyrexia is a grave complication, and usually results in death. The temperature may rise as high as 110° or 112° F. (43.3° or 44.4° C.). Various eruptions are occasionally seen, and, especially in children, nodules (*erythema nodosum*) may appear over the tendons upon the back of the fingers, hands or wrists. Tonsillitis frequently occurs with rheumatism, and certain authorities believe that it results from the same cause. Inflammations of the heart and pericardium are very common, especially in young patients. Chorea is also very frequently seen.

Prevention.—Persons predisposed to the disease should avoid exposing themselves to cold and wet, and during the cold months should wear woollen underclothing. They should take moderate exercise and endeavor to keep the functions of digestion in proper condition.

Treatment.—While the inflammation remains acute

the patient should be kept in bed and warmly covered. When it becomes necessary to change his position he should be lifted; consequently a muscular nurse is an essential. The bowels should be kept open by saline laxatives. The drug which exercises the most beneficial influence over the disease is sodium sali-



CLINICAL CHART OF ACUTE ARTICULAR RHEUMATISM showing renewal of the febrile movement consequent upon fresh joint involvement.

cylate, given in large doses and in connection with the alkalies. Such medication should be given only upon the physician's prescription.

The fever may be controlled by sponge baths; for the hyperpyrexia cold packs or tubs are required. In nursing, care must be taken when applying local appli-

cations to move the affected joints very gently and as little as possible. Local applications of equal parts of guaiacol and glycerin, of oil of wintergreen, or of glycerin and the fluid extract of belladonna will do much to relieve the pain in the joints. The parts may be bandaged with flannel bandages and should be protected by "cradles" of barrel hoops from the weight of the bed-clothes. The patient should be moved as little as possible and never allowed to exert himself, in order to avoid unnecessary strain upon the heart. Further comfort may be obtained by wrapping the joints in cotton, and by the application of padded splints, sand bags, or small pillows adjusted about the inflamed limbs. The joints should always be placed in mid-flexion. Very severe pain may be mitigated by the application of blisters. Care must be taken not to jar the bed, nor to allow any sudden noise to startle the patient. During convalescence he should remain quiet and should avoid draughts. Too early return to meat diet is to be strongly advised against.

Pericarditis or endocarditis may be controlled by the application of cold over the heart and by sedative drugs.

The Diet during the febrile stage should be entirely of fluids. Milk and strained gruels may be given (no meat broths). During convalescence a gradual return to a solid diet is permissible. The following articles may be given: vegetable soups, farinaceous puddings (without sugar), milk toast, and, later, fresh vegetables, fish, eggs and chicken. Other meats are usually withheld as long as possible.

Alcoholic drinks and sweets are especially to be avoided. Saccharin may be used to sweeten the food.

The nursing is to be carried on in accordance with the usual rules.

Erysipelas.

Synonym.—St. Anthony's Fire.

Definition.—An acute, febrile, contagious disease, characterized by a chill, intense redness of localized areas of skin and mucous membrane, a remittent fever, and a tendency to recur.

Causation.—The disease is met most frequently in the spring and autumn, and amid unhygienic surroundings. It attacks most commonly individuals addicted to alcohol and others who are constitutionally weakened. It has been known to become endemic. Its specific cause is a germ known as the *streptococcus erysipelatus,* which enters the body through some abrasion of the skin or mucous membrane. The abrasion may be so small as to escape notice.

Varieties.—There are various forms of this disease, but the more important are the following:

(1) *Cutaneous Erysipelas.*—The onset is sudden, with a chill, fever and spots of redness on the skin. The fever is high and remittent and terminates on the fourth or fifth day, usually by crisis. In young persons the symptoms are, as a rule, slight, but erysipelas in infants, which is likely to follow infection of the umbilical cord, is generally fatal; in old persons the nervous symptoms may be marked, and death usually results.

The red spots tend to coalesce and to become slightly elevated. The margins of the infected area are sharply defined, red and swollen. As the disease progresses this area spreads, the color at the original site fading as fresh areas are involved (*wandering erysipelas*). The redness disappears on pressure, to return as soon as the pressure is removed. There is slight burning pain. Vesicles, which may become pustules, appear on the involved part. The eruption may vary in shade; it is usually bright or dark red in vigorous persons, dusky when pus is about to form, and blue when gangrene is about to appear or when there is involvement of the heart or lungs. When the inflammation ceases, the swelling and redness disappear and desquamation follows.

(2) *Phlegmonous Erysipelas.*—The onset is marked by chills, sweats, high temperature (104° to 106° F. —40° to 41.1° C.), delirium and severe prostration. The swelling is much more pronounced than in the preceding type, and may be so intense as to produce sloughing or gangrene. Suppuration generally takes place, extending into the tissues beneath, into the muscles, and even into their sheaths and those of the tendons. As the disease progresses, sloughs form and fall, leaving ulcers; in some cases the muscles, tendons, etc., may be eaten away. This type of the disease sometimes follows extravasation of urine.

(3) *Cellulitis* is that form of erysipelas in which the microbe has effected entrance through a wound. The swelling, which is not so marked as in the phlegmonous

variety, appears before the redness, which latter symptom is not so pronounced as in the cutaneous form. The inflammation appears at the edge of the wound and does not leave the original focus as the disease extends. The poison, in mild cases, is disposed of by the lymphatic system, but severe cases are marked by suppuration in the wound and the adjacent lymph glands.

Complications such as septicæmia, pyæmia, pneumonia, meningitis and arthritis may arise.

Treatment.—The first step in all forms of the disease is to isolate the patient; he should be kept in bed and the wound, if evident, should be thoroughly cleansed with antiseptics; the bowels should be kept freely open. In vigorous persons facial erysipelas requires but little treatment, but in weak and debilitated individuals free stimulation is necessary. High temperature may be controlled by cold bathing. An injection of a two per cent. solution of phenol (carbolic acid) into the healthy skin just beyond the inflamed area, or a band of tincture of iodine painted upon the skin, may arrest the advance of the disease; scarification is sometimes practiced. Lead and opium wash, a ten per cent. solution of ichthyol in water, or an ichthyol ointment, will relieve the burning pain. In the phlegmonous variety the sloughs should be cut out, and hot or cold fomentations applied. Continuous irrigation of the sloughing surface with an antiseptic solution may be employed. In the form characterized by cellulitis, disinfection and free drainage of

the wound by incision are necessary. The constitutional treatment of all forms of the infection is supportive and stimulative.

Injections of antistreptococcus serum have been employed in the disease, with varying results.

The Diet during the febrile stage should be of fluids and easily digested semi-solids. After the temperature has become normal, easily digestible solids may be allowed.

The nurse should pay the utmost attention to the condition of her hands and face. She should carefully seal all abrasions of the skin with sterile collodion and should thoroughly sterilize her hands after contact with the patient. Before attending another patient she should bathe and wash her hair with mercury bichloride solution, and all clothing worn while in association with the patient should be properly disinfected. Aside from these points the general principles of fever nursing are applicable in erysipelas.

Septicæmia.

Synonym.—Blood-Poisoning.

Definition.—A disease due to the existence in the blood of any of the pus-forming germs and characterized by recurring chills and irregular febrile movement.

Causation.—Pus germs may effect entrance to the body through any abrasion in the skin or mucous membranes. The site of their entrance may be so minute as to be impossible of discovery, or it may be a wound of any size or character. The germs having entered

the system, the symptoms are produced either by the germs themselves or the products of their growth (toxins), or by both these elements combined.

Course and Symptoms.—Within a few hours after infection has taken place the patient suffers from chilly feelings, or a distinct chill, followed by a rise of temperature. He becomes restless, his skin is hot and dry, and there may be headache, general pains, nausea and vomiting. The pulse is rapid and the respiration usually accelerated. These symptoms may last but a few days in mild cases, and then disappear. In severe septicæmia the symptoms are greatly intensified and those referable to the nervous system are very marked. The chill at the onset is severe and at intervals other chills occur. The temperature rises rapidly and may reach 104° to 106° F. (40° to 41.1° C.). In some cases the temperature may fall below normal. The prostration is great; the pulse feeble and rapid. As the disease progresses the symptoms become those of the typhoid state. The tongue becomes brown and dry; the skin is wet with cold perspiration. There may be diarrhœa. The urine is high-colored and is likely to contain albumin and casts. The wound which is the source of infection may become dry, gangrenous and fetid.

In what is known as the *progressive* form of septicæmia the symptoms begin less acutely and progress less rapidly; otherwise they resemble those just described. The fever may persist for a number of weeks; frequent chills and sweats accompany it and various skin eruptions are likely to appear. This variety of

the disease may prove fatal within a few weeks, or last for a long time and eventually end in recovery.

Prevention.—This consists in careful attention to hang-nails and other abrasions when they exist. Such abrasions on the person of a nurse attending a septic patient should be covered with collodium, or, if necessary, she should wear rubber gloves. Any wound received while in contact with such a patient must be immediately cauterized with pure phenol (carbolic acid), which should be quickly washed off with alcohol. In the absence of this agent, the wound should be sucked, to induce free bleeding, and dressed antiseptically.

Treatment consists in keeping all wounds as clean and free from septic material as possible and, in certain cases, entire excision of the infected focus. The bowels should be kept open by salines; the fever should be combated by cold sponges. Stimulation by means of alcohol is frequently necessary.

The chronic form of the disease, when it is impossible to remove the source of the infection, should be treated by supportive measures and tonics.

The Diet should consist of easily digested foods in plentiful quantity, and be administered with frequency and regularity.

Puerperal Fever.

Synonyms.—Puerperal Septicæmia; Puerperal Infection; Child-bed Fever.

This disease is merely a variety of septicæmia in which the point of entrance of the infection is the

uterine mucous membrane. The chief cause is the incomplete removal of placental tissue after childbirth. The constitutional symptoms are the same as those described under septicæmia, and, in addition, the discharge from the vagina may be profuse and very foul.

With proper care the disease should be almost entirely preventable.

During pregnancy the attending physician should treat all inflammations of the vulva, urethra, bladder, vagina and uterine cervix, in order that at the time of delivery there shall be no source from which infection may enter the uterus. As the time of labor draws near the patient should be told not to touch her genitals. The physician should make as few vaginal examinations as possible, and these only after thorough cleansing of the parts and sterilization of his hands. The nurse should make none at all. In preparing the patient for vaginal examination the nurse should first cleanse her hands by thorough scrubbing with a brush, soap and hot water, afterwards soaking them for five minutes in mercury bichloride solution, 1 to 3000; she should then cleanse the patient's external genitals by means of cotton solution wet in 1 to 3000 mercury bichloride, and place her in the position preferred by the physician. If instruments be used, these must first have been boiled.

During labor the strictest asepsis with regard to hands, instruments and dressings must be maintained.

If the delivery be instrumental, or if manual removal of the placenta or its membranes becomes necessary,

it is usual to follow these procedures by an intra-uterine douche of 1 to 5000 mercury bichloride solution, given from a fountain syringe which has previously been washed with hot five per cent. phenol (carbolic acid) solution, and through a glass douche nozzle which has been boiled.

During the puerperium all dressings applied must be strictly sterile and manipulated with sterilized instruments and hands. Should catheterization become necessary it should be performed in the usual manner (*see* p. 52).

Treatment.—The general treatment of puerperal sepsis is identical with that of septicæmia from other causes. The special treatment consists in attempting to maintain cleanliness in the vagina and uterine cavity. This may be done by irrigations of 1 to 10,000 mercury bichloride or one per cent. compound solution of cresol, which is official, and by packing these cavities loosely with ten per cent. iodoform or sterile gauze.

When the infection is due to retained fragments of placenta or membranes, these should be removed by blunt curettage, followed by a douche of the composition described above.

Pyæmia.

Definition.—A febrile disease due to infection by pus-forming germs, which are carried by the blood from one part of the body to another, and at their points of lodgment set up local infectious processes.

Causation.—The cause of pyæmia has already been

dealt with in the section devoted to the causation of septicæmia (p. 166). The pus-forming germs having effected entrance to the blood stream, by this means are transferred to various parts of the body, and they may cause abscesses wherever they lodge.

Course and Symptoms.—The symptoms of septicæmia usually precede those of this disease. The onset of pyæmia is marked by an intense chill, followed by a rapid rise of temperature, general pains, vomiting and great prostration. The pulse is rapid and weak. Chills frequently recur and the temperature curve is marked by frequent quick falls and rises. The temperature often drops to normal or below, and suddenly rises to several degrees above the normal level. There are frequent sweats. The patient loses flesh rapidly, the tongue is dry, and the breath may have a sweetish smell. There may be diarrhœa, with foul-smelling stools. Sometimes the skin is slightly jaundiced, and various eruptions may appear. The urine is high-colored and scanty, and may contain albumin and casts. Late in the disease delirium and stupor are frequent. The patient grows rapidly weaker and there is a marked tendency to the formation of bed-sores. As the infectious process is set up in the various organs certain symptoms occur as follows:

(*a*) If in the lung, pain in the chest, shortness of breath, and cough with blood-stained expectoration.

(*b*) If in the liver or spleen, pain and tenderness referred to the regions of these organs. When abscess formation occurs, local swelling is likely to be noted.

(*c*) If in the heart, the pulse becomes more rapid, the temperature higher, and the respiration accelerated.

(*d*) If in the kidney, there may be pain and there usually is bloody and albuminous urine.

Prevention.—The prevention of this disease is identical with that in the case of septicæmia.

Treatment.—The treatment resolves itself into opening and draining the abscesses when their situation permits. Otherwise pyæmia should be managed in accordance with the methods already laid down for septicæmia.

The nursing of septicæmia, puerperal fever, and pyæmia, aside from the special points mentioned under these diseases, should be conducted along the same lines as those proper in general fever nursing.

Mumps.

Synonym.—Epidemic Parotitis.

Definition.—An acute, infectious disease which is characterized by inflammation of one or both parotid glands, extending occasionally to the submaxillary glands, and rarely affecting by metastasis the testicles, ovaries and mammary glands, and which is accompanied by mild constitutional symptoms.

Causation.—The disease is most commonly seen in childhood and youth, and usually occurs in the winter and spring. It is more common in males than in females. By no means all the children exposed contract the disease. Mumps spreads by contact in most cases, but it has been known to be communicated

through a third person and by clothing. Its specific cause is not known, and one attack usually confers protection.

Course and Symptoms.—The incubation period is usually about two weeks, but may extend to twenty-one days. The onset of the disease is marked by chills, followed by a rise in temperature to 101° to 103° F. (38.4° to 39.5° C.), headache, general pains, and prostration. In about twenty-four hours one or both parotid glands become swollen and tender, the skin over them becomes tense, and there may be pain on swallowing and sore-throat. An elevation of the lobe of the ear is a characteristic sign of parotid swelling. The glands may be affected simultaneously or successively; in the latter case the disease is prolonged. The inflammation reaches its height in from three to six days, remains stationary for a day or two, and then declines. As the swelling goes down the constitutional symptoms ameliorate. Extension of the inflammation to the other salivary glands, or to the testicles, ovaries or mammæ protracts the course of the infection.

Complications other than those mentioned above and relapses are infrequent.

Prevention.—The patient and nurse should be isolated for at least ten days after the swelling has disappeared, but the disease is of such mild type that the more complicated methods of disinfection are unnecessary.

Treatment.—Rest in bed should be enjoined; very little drug treatment is needed; the symptoms should

be controlled as they arise. Hot or cold compresses should be applied to the affected glands, the bowels should be moved daily, and if the testicles are involved they should be allowed to rest upon a shelf constructed of a strip of adhesive plaster placed across the thighs just below the groins.

The Diet during the height of the disease should be entirely of fluids; the nursing may be carried on according to usual methods.

Bubonic Plague.

Synonyms.—Malignant Adenitis; The Pest.

Definition.—An epidemic, contagious, febrile disease, characterized by swelling and inflammation of the lymph glands and hæmorrhages from the mucous membranes. It is common in India and Eastern Asia, whence it may be imported into Western countries.

Causation.—It is most common in the hot months and is seldom seen in individuals beyond middle life.

The specific cause of the disease is the *bacillus pestis.* This organism enters the body through the respiratory or alimentary tracts or abrasions of the skin, and is found in the blood of patients and in the pus from the suppurating glands. It is given off in the fæces, urine and sputum, and is capable of infecting clothes, bedding, apartments, and the like. It may be carried by fleas and other insects, and by rats, mice, dogs, etc.

Filthy and unhygienic surroundings predispose to the occurrence of epidemics.

Course and Symptoms.—The incubation period lasts from two to seven days, during which time the patient may feel indefinitely ill.

The onset proper is fairly sudden, with chilly feelings followed by high fever (105° to 106° F.—40.5° to 41.1° C.), and rapid pulse and respiration. Headache and general pains are very distressing, and all the symptoms of severe infectious disease are met with.

Vomiting of blood is comparatively frequent.

The mental symptoms are marked, and delirium may appear early.

Within a few days the glands of the neck, axillæ and groins become painful, red, tender and swollen. The buboes thus formed may be gradually absorbed or may rupture, leaving sinuses discharging pus. Rupture is a favorable sign. Carbuncles and hæmorrhages into the skin are common in some epidemics.

The fever lasts about a week, and then, in favorable cases, gradually falls; the other symptoms also ameliorating. The disease, however, is attended by a large mortality.

In certain cases the fever is prolonged for a number of weeks as a result of septicæmic implication, and in others death from the severe toxæmia occurs within a few hours.

The Pneumonic Type is characterized by respiratory symptoms and bloody sputum which contains the bacillus.

Prevention.—Quarantine and the strictest isolation are absolutely necessary, and should be continued for

a month after recovery. The measures necessary for disinfection of excreta, clothing, apartments, etc., are those described in the section on smallpox (p. 205).

Fortunately, physicians and nurses who exercise proper care seldom contract the disease.

Preventive inoculations by various serums have resulted in a very considerable diminution in the death-rate, and the measure is one not to be neglected.

Treatment.—The usual symptomatic treatment of febrile disease is indicated, and local treatment is also required. Cold wet applications should be made to the buboes until the presence of pus is evident, and then incision and drainage are necessary.

Further research may prove that intravenous injections of anti-plague serums are of benefit.

The nursing is the same as that applicable to other actively contagious diseases.

CHAPTER VII.

INFECTIONS OF INTERMITTENT TYPE.

Malarial Fever: Relapsing Fever: Dengue.

Malarial Fever.

Synonyms. — Chills and Fever; Fever and Ague; Paludism; Paludal Fever; Swamp Fever.

Definition.—An infectious disease characterized by paroxysms recurring regularly at various intervals and consisting of a chill followed by fever and sweating.

Varieties.—*Tertian* (*single*), in which the paroxysms occur every forty-eight hours.

Quotidian (*double tertian*), in which the paroxysms occur every twenty-four hours.

Quartan, in which the paroxysms occur every seventy-two hours.

Æstivo-autumnal, in which the paroxysms occur at irregular intervals.

Pernicious, a remittent malarial fever early in which the paroxysms may occur regularly, while later in the disease the temperature does not fall to normal in the interval and may continue high.

Chronic Malaria (*Malarial cachexia*) is caused by the continuance of any of the above varieties; there may be no febrile movement, but the disease is characterized by marked constitutional weakness.

Causation.—Malaria is less common in the very young and in aged persons than in young and middle-

aged adults; negroes are less susceptible to the disease than whites. Malaria is most common in damp and swampy places, and the greatest number of cases is observed in late summer and early autumn.

The specific cause of the disease is a parasite, the *plasmodium malariæ,* which circulates in the blood and which in reproducing itself causes the paroxysms. There are three types of the organism, each causing a different form of malaria. These differ somewhat in appearance, but the important difference is that their life-cycles are of different durations. The tertian form reproduces itself every forty-eight hours, the quartan form every seventy-two hours, and the æstivo-autumnal form at irregular intervals. The quotidian, or daily type, is due to two sets of the tertian organism reproducing themselves upon alternate days, so that a paroxysm occurs each day.

It is believed that these forms are merely different types of the same organism acting in different ways.

It has been conclusively demonstrated that the disease may be transmitted from one individual to another by the bites of certain kinds of mosquitoes, and some observers assert that this is the only means of transmission.

Course and Symptoms.—The incubation period is variable, but is usually from ten to twelve days. The disease caused by the tertian organism is most common in the United States, and the estivo-autumnal form is the most serious of the three main types.

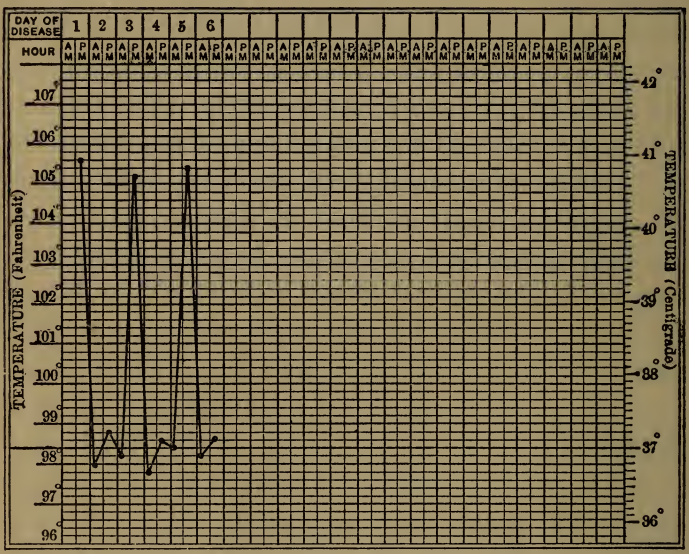
A malarial paroxysm consists of a short period

of invasion, during which there may be headache, nausea and apathy. Then appears the *chill,* which lasts from one-half to two hours; this usually manifests itself late in the morning, and almost never at night. In children it may be replaced by a convulsion. During the chill the patient shivers and complains of great cold, which even hot-water bottles and numerous blankets may not counteract. There is severe frontal headache and perhaps nausea and vomiting. The pulse is rapid and tense. At the end of one or two hours the *febrile stage* commences, and the temperature rises very rapidly to 104° or 106° F. (40° to 41.1° C.). The skin is hot and dry, there is great thirst, and there are severe headache and pain in the back and limbs. The pulse is full and rapid. There may even be brief delirium. The fever lasts from two to twelve hours, then falls rapidly to normal, or perhaps to a degree or two below, and the stage of *sweating* begins. All the symptoms subside and there is profuse perspiration. The patient may now go to sleep and wake later feeling perfectly well. The next paroxysm occurs one, two or three days later, and may begin an hour or two earlier or later than its predecessor; in such event it is spoken of as anticipated or delayed, as the case may be.

During malarial fever, sores on the nostrils or lips are common; if the paroxysms are repeated for a considerable time the spleen becomes enlarged and the patient grows anæmic.

In the æstivo-autumnal type the paroxysms last from

sixteen to twenty hours and the fever tends to become remittent (from 100° to 104° F.—37.8° to 40° C.); the beginning chill is milder and gastro-intestinal symptoms (vomiting, abdominal distention, diarrhœa) are frequently prominent; the headache, restlessness


DAY OF DISEASE
1 2 3 4 5 6
HOUR
A M P M
107° 106° 105° 104° 103° 102° 101° 100° 99° 98° 97° 96°
TEMPERATURE (Fahrenheit)
42° 41° 40° 39° 38° 37° 36°
TEMPERATURE (Centigrade)

CLINICAL CHART OF ORDINARY OR TERTIAN MALARIA showing three febrile paroxysms occurring on altenate days.

and sleeplessness are marked; there may be delirium followed by stupor or coma; the pulse is rapid and frequently weak. This type of the disease may last from ten days to a month or merge into

Pernicious Malarial Fever.—This variety, which is rare in the United States, occurs in three important forms:

(*a*) *The Comatose Type,* in which there are symptoms of severe cerebral disturbance—delirium or coma. The onset may or may not be marked by a chill; the fever is high (106° to 107° F.—41.1° to 41.7° C.) during the paroxysm; there is profuse sweating; the pulse is weak and rapid and there is extreme general weakness. This variety is usually fatal.

(*b*) *The Hæmorrhagic Type.*—There may or may not be a febrile paroxysm; the skin is jaundiced; hæmorrhages occur from the various mucous membranes or into the skin; the urine is diminished, and is dark either from the presence of blood-pigment or blood itself (hæmoglobinuric or black-water fever). There is restlessness or perhaps delirium. The patient may die or the paroxysm may subside, though usually only to recur.

(*c*) *The Algid or Congestive Type* (*Congestive Chill*).—This is characterized by severe gastric and intestinal symptoms (the diarrhœa in particular may be very marked), indefinite chilly sensations with clammy skin, blueness and great prostration are frequent. The temperature usually is not high, and may be subnormal; jaundice is common and the condition is a very serious one.

Malarial Cachexia, or *Chronic Malaria,* is a consequence of continued attacks of the ordinary forms of the disease and is characterized by extreme weakness, yellowness of the skin, and profound anæmia. Enlargement of the spleen is usual in this, as in other forms of protracted malaria. Shortness of breath and

swelling of the feet and ankles are common, and bleeding from various parts of the body may occur. The temperature may continue low, or may show irregular elevations to from 102° to 103° F. (38.9° to 39.5° C.).

Prevention.—The extermination of mosquitoes and the draining of swampy lands go far toward lessening the frequency of the occurrence of this disease.

Treatment.—During the chill the patient should be kept warm by means of blankets and hot-water bottles. The headache may be relieved by hot or cold applications. Sponging with cold water may be practised during the febrile stage, and the thirst may be mitigated by frequent drinks of cold water or lemonade. During the stage of sweating the nurse may make the patient more comfortable by wiping his skin with warm flannel.

Quinine should be given by mouth in the ordinary types of the disease, though not during the height of the fever, when it may be vomited; in the pernicious types it should be given hypodermatically and in connection with arsenic.

Malarial cachexia responds best to quinine, in the form of Warburg's tincture, and arsenic, with iron and various other tonics to build up the system as adjuvants. Massage, especially over the splenic region, is useful.

The diet during the febrile movement should be of fluids only, but in the intervals between the paroxysms simple solid diet may be allowed.

With regard to points other than those given above for the nursing of malaria, the attendant may conduct the case in accordance with the general principles of fever nursing.

Relapsing Fever.

Synonyms.—Famine Fever; Recurrent Typhus; Spirillum Fever; Seven Day Fever.

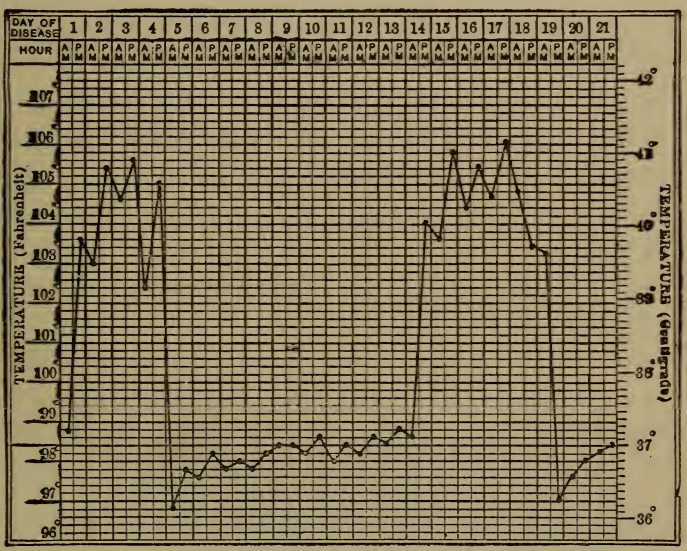
Definition.—An acute, epidemic infection characterized by a febrile movement lasting about six or seven days, followed by an afebrile interval of about a week, after which the febrile paroxysm recurs and may be repeated three or four times.

Causation.—The most favorable conditions for the development of the disease are those of famine and filth, and epidemics of it have been frequently noted in association with those of typhus fever, which is favored by the same conditions. The specific cause is a spiral-shaped bacterium which circulates in the blood, but is not found in the stools and other excreta. It is found in the blood only during the febrile stage. The infection is transmitted by clothing, bed-linen, etc., by personal contact, or through a third person. Physicians merely visiting cases for short periods are less liable to infection than nurses. How the organism effects entrance to the body is unknown; possibly it is taken in with the inspired air or through the skin. The disease occurs in both sexes and in all ages, but is rare in the United States. One attack does not protect against subsequent infections.

Course and Symptoms.—The incubation period is usually from four to ten days, although it may be much shorter. The onset is sudden, with a chill followed by fever, severe headache, and pains in the back and limbs. Sweating is common. The temperature rises rapidly, and may reach 104° F. (40° C.) upon the first day. The pulse is rapid (110 to 130). There may be severe nausea and vomiting, as well as marked cerebral symptoms. Intestinal derangement is rare; jaundice is frequent. The spleen is enlarged and, rarely, may rupture. There is no typical eruption, but there may be a reddish mottling of the skin or petechial spots. The fever, after lasting usually for from five to seven days, falls by crisis in a few hours to normal or below. Accompanying the fall in temperature there is usually sweating and sometimes diarrhœa. The patient rapidly regains strength, but in a week (quite constantly on the fourteenth day from the initial chill) the attack is repeated. The relapse is, as a rule, shorter than the first paroxysm, and several (three to five) of these may occur, at intervals of seven days. Very rarely there is no appreciable relapse, and towards the end of epidemics the relapse may be slight in character. In protracted cases convalescence is slow, for the patient is likely to be much weakened. The disease is not a very fatal one, and death, when it takes place, is usually due to complications. In negroes, however, in whom marked jaundice is almost always a prominent characteristic, it has been noted that the mortality is very much larger than in whites.

Complications.—Pneumonia and bronchitis are the most important; gastric or intestinal hæmorrhages are more rare.

Prevention.—On the appearance of an epidemic measures should be taken to provide food for the suffering poor and to improve the sanitary condition of



CLINICAL CHART OF RELAPSING FEVER showing the febrile movement upon the fourteenth day.

their surroundings in every way, especially by attention to the proper disposal of garbage. Although there is no proof that the disease is transmitted by drinking water, it is wise to boil all water used for this purpose. Relapsing fever does not spread readily under conditions of cleanliness and where ventilation is thorough;

consequently, plenty of fresh air should be given access to the sick-room and when the disease has run its course the apartment, as well as the clothing, bedding and utensils, must undergo proper disinfection.

Treatment.—The patient should be isolated and kept under strict quarantine. There is no drug which affects the course of the disease; so that the symptoms must be treated as they arise, according to general principles. The temperature may be controlled to some extent and the patient be made more comfortable by cold sponging. The diet should be fluid, but in the afebrile intervals semi-solids may be allowed. When there is extreme prostration very free stimulation is necessary.

The nursing should be conducted according to the methods usual in febrile diseases.

Dengue.

Synonyms.—Breakbone Fever; Dandy Fever.

Definition.—Dengue is an acute, infectious febrile disease occurring in warm countries and characterized by pains in the muscles and joints and an erythematous skin eruption.

Causation.—It occurs chiefly in hot climates and at the warmer and more moist seasons of the year. It is common in the East and West Indies, but is seldom seen in the United States, except along the coast of the Gulf of Mexico. It is believed to be caused by a microörganism which circulates in the blood and is transmitted through the bites of mosquitoes, in the

same manner as the infection of yellow fever. The infection is probably not transmitted by contact with patients nor through clothing, etc. The disease is seldom fatal.

Course and Symptoms.—The incubation period is from two to five days. The onset is marked by an acute chill, or in the case of children by a convulsion. A rise of temperature to from 104° to 106° F. (40° to 41.1° C.) follows. The pulse is rapid and there are nausea, vomiting and severe headache, accompanied by pain and tenderness in the muscles of the trunk and limbs. The joints are hot, painful, red, tender and sometimes swollen. The pains in the joints and muscles, causing a stiff gait, have given rise to the name "dandy fever." The glands of the neck, axillæ and groin may be swollen. There are flushing of the face, suffusion of the eyes, a coated tongue, highly colored and scanty urine, and weakness and prostration. The eruption is a reddish blush, which may itch and which usually disappears on the third or fourth day; it is sometimes followed by desquamation.

The rise in temperature lasts from three to five days and then falls by crisis accompanied by sweating and amelioration of all the symptoms. The temperature remains normal for several days and then the symptoms of the onset of the disease return, but with less severity; during this recurrence various forms of eruption may appear on the skin. The recurrence lasts from two to three days, when a second crisis ensues; after which convalescence is established.

The patient recovers strength slowly and is likely to be troubled by a persistence of the joint pains.

Relapses are not infrequent, but complications are rare.

Prevention of the disease consists in destroying the mosquitoes, preventing their access to patients ill with the infection, and protecting the healthy from their bites. Quarantine and disinfection, in the light of our recently acquired knowledge of the mode of transmission of the contagium, are unnecessary.

Treatment.—The patient should be kept in bed while the symptoms are acute. The medicinal treatment is wholly symptomatic; the pains may be relieved by the administration of various analgesic drugs and the joint inflammation lessened by applications of cold or heat.

The Diet during the febrile stages must be of fluids alone; during convalescence strength-giving foods should be given in easily digestible forms.

The nursing should be carried on in accordance with general principles.

CHAPTER VIII.

THE EXANTHEMATA.

Scarlet Fever: Smallpox: Chickenpox: Measles: German Measles: The Fourth Disease of Dukes: Epidemic Cerebrospinal Meningitis.

These diseases are known as the *infectious exanthemata* (from a Greek word meaning an eruption), and are characterized each by a typical rash upon the skin. They are all contagious and, except smallpox, are most frequently seen in children.

Scarlet Fever.

Synonym.—Scarlatina.

Definition.—An acute, infectious fever characterized by a scarlet rash upon the skin and usually accompanied by sore-throat.

Causation.—The disease is endemic and at times appears in epidemics of varying intensity. The majority of cases occur in children under ten years of age. Nursing infants, however, seldom contract the disease; during pregnancy and after surgical operations susceptibility is increased. Certain individuals, some families and certain races, for instance the Japanese, seem unable to acquire the infection. Scarlet fever is due to a specific organism which it is believed has been recently discovered.

The infection is spread chiefly by the flakes of skin cast off by the patient and perhaps also by means of his exhalations. The contagium clings persistently to clothing, books, toys, and the like, and is capable of transmitting the disease for months and even years. The physician or nurse may carry the infection to a third person. Epidemics are most frequent in the autumn and winter. One attack usually protects against subsequent infections. It should be remembered that scarlatina is not a light form of scarlet fever, but that the two terms have exactly the same meaning.

The eruption appears from twelve to thirty-six hours after the onset of the disease, in the form of tiny red points; these may be so numerous and close together as to give the appearance of diffuse redness; they may occur in irregular patches or they may be widely scattered.

The rash appears first on the neck and shoulders and extends to the trunk, arms and legs. In from one to four days it reaches its maximum and the skin becomes almost uniformly red and swollen. Drawing the finger-nail over the skin leaves a whitish line which quickly disappears. The eruption is most marked upon the parts of the body which are kept warm. Upon the face the eruption is much less marked and usually appears only on the forehead and cheeks, the skin about the nose and mouth remaining pale. The eruption remains at its height for from one to three days and gradually disappears as the temperature approaches normal.

Irregular eruptions are frequent and puzzling; they may appear only upon the trunk, the limbs or the face; they may remain in the stage of diffuse patches; they may last but a few hours; they may be entirely absent.

Course and Symptoms.—The incubation period is usually one week, but may vary from one day to three weeks. Usually during this time there are no symptoms except possibly slight sore-throat. The invasion is sudden, with a chill or convulsion followed by a rise of temperature (104° to 106° F.—40° to 41.1° C.), rapid pulse, headache, vomiting and sore-throat. In from twelve to thirty-six hours the eruption appears, and in about four days the entire skin is red, inflamed and tense; the rash may be present upon the mucous membranes of the mouth and throat, causing them to appear vividly red. The tongue is at first coated in the centre and red and clean at its edges and tip. Through the coating the red tips of the papillæ may be seen, giving the so-called "strawberry" appearance. In a few days the coating peels off, leaving the tongue red and roughened—the "raspberry" tongue. The fever continues, with slight morning remissions, and falls gradually as the rash fades; reaching normal about the seventh day.

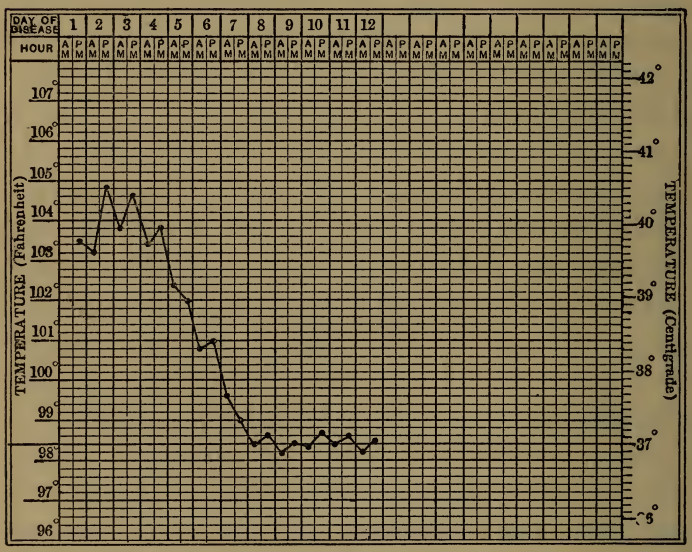
The sore-throat varies in intensity from a slight redness and swelling of the fauces and tonsils to a marked inflammation with a false membrane involving all the parts about the pharynx and accompanied by enlargement of the glands under the jaw.

The spleen may be slightly enlarged. The urine

presents the characteristics usual in febrile disease and the existence of albuminuria is frequent. Daily examinations of the urine should be made, and it is part of the nurse's duty to save specimens for them.

As the temperature falls the symptoms ameliorate.

Desquamation.—As the fever and rash disappear the


DAY OF DISEASE
1 2 3 4 5 6 7 8 9 10 11 12
HOUR
A M P M
107° 106° 105° 104° 103° 102° 101° 100° 99° 98° 97° 96°
TEMPERATURE (Fahrenheit)
42° 41° 40° 39° 38° 37° 36°
TEMPERATURE (Centigrade)

Clinical Chart of Scarlet Fever.

skin becomes dry and roughened and its upper layer loosens. This takes place first upon the chest, and gradually the dried flakes fall; the process continues from two to three weeks. Rarely the hair and nails are lost.

Severe Forms of the Disease—*The Anginose Form.*—This is characterized by extreme severity of

the throat inflammation. The pharynx and tonsils are swollen and red, and a membrane forms which may extend upward to the posterior nares or forward into the mouth; the lymph glands beneath the jaw and in the neck are swollen and necrosis of the tissues of the throat may follow; with this there is a very foul odor. The inflammation may go on to involve the middle ear and more rarely the trachea and bronchi. Any symptoms referable to the ear should be at once reported to the physician. The prostration is very marked. If the disease is not rapidly fatal, abscesses frequently form in the tissues of the neck. Recovery is rare.

The Hæmorrhagic Form.—In this variety hæmorrhages may take place into the skin or mucous membranes, and may be evidenced by hæmorrhagic spots upon the skin, nose-bleed, or bloody urine. In this type death may occur as early as the third day.

The Malignant Form.—In this the invasion is very severe and accompanied by marked cerebral symptoms —delirium or stupor; there may be suppression of urine, the temperature rises rapidly to a very high point (108° F.—42.2° C.), and death is likely to supervene even before the rash is developed.

Complications and Sequelæ.—The most important of these are nephritis and inflammation of the middle ear. *The nephritis* varies in intensity from a mild type, with slight albuminuria and hardly noticeable œdema of the feet and ankles, to severe inflammation with diminished or even suppressed urine. In the intense cases there are considerable albumin, numerous

casts, and perhaps blood in the urine, marked dropsy, constant vomiting, and uræmic convulsions. Some of these patients die, or the disease may go on to permanent chronic nephritis; but prompt and proper treatment may result in the disappearance of the symptoms and the return of the kidneys to a healthy condition.

Ear Complications are frequent and are due to an extension of the throat inflammation through the Eustachian tubes. The otitis causes severe pain, which persists until the drum membrane ruptures or is punctured, allowing the escape of the pus. The ear inflammation may extend to the mastoid processes or even to within the skull, and cause various meningeal and brain complications. Deafness is not an uncommon result.

Joint Complications, with all the symptoms of acute articular rheumatism, may occur. These usually appear after the temperature has fallen to normal, but may show themselves during the febrile movement.

Heart Complications are not rare, and often result in a permanent affection of one or more of the valves of that organ. Inflammations of the pericardium and of the heart-muscle may occur as well.

Pleurisy and Pneumonia are infrequently associated with scarlatina.

Chorea sometimes complicates the disease and is most likely to occur when the scarlatina is followed by endocarditis and arthritis.

Throat Complications.—These have been considered above (*see* page 192).

Prevention.—The patient should be immediately isolated and other children of the family removed. These latter should be kept from association with other children for ten days at least in order that the disease may develop if they have been exposed; careful watch should be kept of their throats.

The hygiene of the sick-room should be the same as in other contagious diseases (*see* pp. 149 *et seq.*), and all clothing, dressings, utensils and discharges should be cared for in exactly the same manner. Free ventilation of the sick-room is important and a temperature of 65° to 70° F. (18° to 20° C.) should be maintained. The patient must be kept in bed, even when the disease seems the mildest, and lightly covered, but should be sedulously guarded from draughts. Both the physician and the nurse should wear a cap and gown over their ordinary clothing when in the patient's presence, and the former upon leaving the sick-room should pass directly into the open air. A sheet wet with five per cent. phenol (carbolic acid) solution and suspended before the door of the apartment is an excellent measure.

The quarantine should be continued for from six to eight weeks (longer if desquamation has not ceased during this period), and when it is raised both patient and nurse should bathe as after smallpox (*see* page 205), and the apartment with its contents should be disinfected after the usual manner and thoroughly aired. Books, toys, and the like, with which the patient has come in contact should be burned.

Treatment.—The general treatment of the disease is symptomatic. Considerable research has of late been carried out along the line of serum treatment, but so far the results have been inconclusive.

The patient should receive two lukewarm sponge baths daily, and if there is distressing itching and burning of the skin he may be lightly smeared with albolene, olive oil, or cacao butter. This should be done twice a day when desquamation has commenced, for it is not only grateful to the patient, but also prevents the dissemination of the flakes of skin.

Copious and frequent draughts of water, plain or carbonated, should be urged upon the patient, and in cases with very high temperature two cool baths (90° to 70° F.—32.2° to 21.1° C.) should be given daily. The mouth, throat and nose should be subjected to frequent spraying and cleansing with Dobell's or other alkaline solution, for by this means aural involvement may be in a great measure prevented. The urine must be examined daily, and the nurse should prepare a specimen each day before the physician's visit.

The Diet.—During the febrile stage the diet should be of fluids alone (*see* general principles of feeding in fevers, p. 58), but when the temperature has become normal a gradual return to solid diet is advisable. In cases with albuminuria, meats must not be allowed as long as this symptom persists.

The nursing should be carried on in accordance with the principles laid down for the infectious diseases.

Smallpox.

Synonym.—Variola.

Definition.—Smallpox, as distinguished from grand pox (syphilis), is an acute infectious disease characterized by a typical eruption appearing first in the form of macules or spots, and becoming successively papules, vesicles and pustules, upon the last of which crusts form which drop off and leave scars.

Causation.—The disease has existed as an epidemic since many centuries before Christ, and until the introduction of vaccination was so universal a scourge that persons who showed no pock-marks were rarely seen. Its specific cause is believed to be a recently discovered microörganism. Smallpox is contagious throughout its entire course after the eruption has appeared, and a few moments of association with an individual suffering from it are a sufficiently long time to contract the disease. The contagion may be carried great distances in clothing, etc., and the pulverized dry crusts retain the power of transmitting the infection for several years. Inoculation from the contents of the vesicles and pustules, the scabs, and the blood is possible. It is believed that the infection enters the body with the inspired air, and it probably exists in the secretions and excretions and in the exhalations from lungs and skin. The severest type of smallpox may be contracted from a person who apparently suffers from a very mild attack. The disease respects neither race, age nor sex, and very few unvaccinated persons escape after exposure. Usually, but not always, one attack

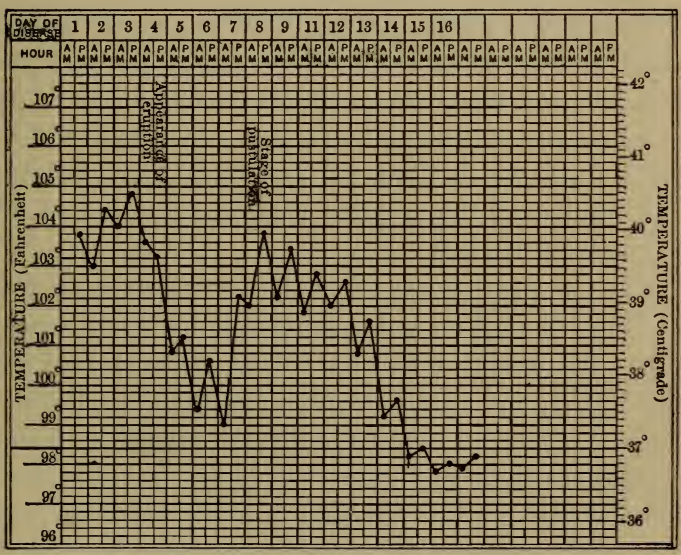
precludes the possibility of a second infection. Inasmuch as this disease occurs almost exclusively in unvaccinated persons, it may be said to be a disease of choice.

The Eruption appears about the third day, first upon the face and scalp, and then spreads until it involves most of the skin and mucous membranes. At first it is in the form of round, red spots, which by the second day become slightly elevated; by the sixth day these have become vesicles with depressed centres (umbilicated), and by the eighth day they have changed into pustules. As this last transition is taking place the skin and mucous membranes become swollen and inflamed. If the pustules extend into the deeper layers of the skin, scars (pock-marks) result.

The eruption appears upon the tongue and the lining of the mouth and throat; rarely it extends into the œsophagus and stomach; it may show itself in the rectum. In the larynx it is accompanied by inflammation and sometimes by œdema. Rarely the eruption appears first upon the mucous membranes. The above is a description of the discrete form of the eruption; in the rarer types of the disease the rash may undergo various modifications.

Course and Symptoms.—The incubation period is usually from ten to fifteen days. The invasion is sudden, with a distinct chill or chilly sensations followed by a rapid rise of temperature (103° to 106° F.—39.5° to 41.1° C.). The pulse is rapid (100 to 120) and full, the respirations are accelerated, the

tongue is coated, and there may be vomiting, convulsions or delirium. There are severe headache and general pains. A pronounced aching pain in the small of the back is so typical as to be an aid in distinguishing smallpox from other eruptive fevers. A feeling as of shot under the skin of the palm at the base of



CLINICAL CHART OF SMALLPOX showing fall of temperature upon the appearance of the eruption and its rise upon the incidence of the stage of pustulation.

the thumb, due to the undeveloped eruption, is another early diagnostic point. There may be sore-throat and conjunctivitis; there is usually enlargement of the spleen; bleeding from the skin and mucous membranes are rarer symptoms.

On the second or third day certain rashes (not the true smallpox eruption) may appear in the form of petechiæ, streaks or diffuse blushes, which are reddish, brownish or purple in color. These become paler on pressure. They are not raised and may occur on any part of the body, but are most frequently seen on the inner sides of the thighs and arms, the groins, upper abdomen, and chest. About the third day the typical eruption appears, and in a favorable case the temperature falls and the other symptoms subside. The eruption then passes through its various stages, until finally scabs form which drop off and leave scars behind. The healing of the eruption may be accompanied by troublesome itching.

The Confluent Form of smallpox follows a shorter period of incubation and is ushered in by severe symptoms; the temperature may rise as high as 110° F. (43.3° C.), and as the eruption appears there is very little amelioration of the patient's condition. The papules are large, and when they become pustules they run together, so that the skin is infiltrated with pus. The confluency may be confined to the face, hands and feet, or it may involve the entire surface of the body. The mucous membranes are swollen and much inflamed, and may become gangrenous. With this inflammation all the symptoms of sepsis are present—rapid, feeble pulse, marked nervous symptoms, and great prostration. An intolerable odor rises from the patient, and the picture presented by him is perhaps more horrible than that in any other disease. The forma-

tion of scabs in this variety of smallpox may take three or four weeks.

The Malignant Form.—In this type of the disease the temperature may never be high, but the constitutional symptoms (especially those referable to the nervous system) and the prostration are very marked. This form of smallpox is usually fatal. In it the rash is likely to be typical, but death may take place before the rash appears at all.

The Hæmorrhagic Form is characterized by the effusion of blood into the skin and the pustules, and bleeding from the mouth, nose, lungs, stomach, or any of the mucous membranes. This type as a rule is fatal, death occurring sometimes as early as the third or fourth day. Neither this nor the malignant variety is often seen in persons who have been vaccinated.

Varioloid is true smallpox occurring in individuals who have been vaccinated, and is a shorter and milder disease than the unmodified variety. The eruption is not extensive, the pocks are small, and some of the vesicles may dry without becoming pustules; there is rarely any scarring. The initial symptoms are not severe, with the exception of the pain in the back, and when the rash appears, which it usually does about the third or fourth day, the constitutional disturbance subsides. The eruption dries and the scabs fall from five to seven days after the appearance of the eruption.

The severe types of smallpox may be contracted by unvaccinated persons from the mild form.

Prevention.—The introduction of vaccination by

Jenner at the close of the eighteenth century has caused smallpox to become a rare disease in communities where the measure is systematically practised, and too great insistence cannot be laid upon the necessity for the routine performance of the procedure. All children should be vaccinated at from three to five months of age, every seven years thereafter, and in the intervals whenever the disease is prevalent; at such times one should never be satisfied with an unsuccessful attempt. Vaccination does not always protect, but the disease as it occurs in those who have undergone the operation is very rarely severe.

Vaccination is performed as follows: The site selected is, in the case of boys, the outer side of the arm at the junction of its upper and middle thirds. In vaccinating girls in the upper walks of life it is preferable to use the outer side of the calf. Human lymph or calf lymph may be used, but the latter is preferable. The skin over the part chosen should be sterilized by washing with soap and water, followed by alcohol and 1 to 5000 mercury bichloride solution, after which it is wiped off with sterile water and allowed to dry. Then with a needle which has been sterilized by heating in a gas flame a surface one-eighth to one-fourth of an inch in diameter is lightly scratched, care being taken not to draw blood, but merely to remove the upper layers of the integument. A slight exudation of serum will follow this procedure, and into this the vaccine should be rubbed for several minutes. The surface should be allowed to dry, and

then be dressed lightly with a compress of sterile gauze. The various shields sold to cover vaccination wounds should not be used. Different makers supply dried vaccine upon quills or ivory points. When from a reputable manufacturer these may be used. The health boards of certain cities furnish calf lymph put up in glass tubes and packed with a needle, a bit of wood, and full directions for the performance of the operation. When available such an outfit may be employed.

The train of symptoms following vaccination is termed *vaccinia* and it differs in different individuals. If the procedure is successful and the vaccination "takes," a papule appears about the third day; on the fifth to the seventh day this becomes a vesicle surrounded by a red area, which about the eighth day becomes the seat of a suppurative process and is painful and tender. From this time the inflammation gradually subsides, and about the twenty-first day the scab falls, leaving the familiar whitish scar. Protection is believed to be effected about the thirteenth day.

About the third day after vaccination there may be a rise of temperature, which may last a week or more; with this there are headache, gastric disturbances, restlessness, etc., but usually these symptoms are of little moment and require no special treatment. Frequently there is enlargement and tenderness of the axillary or inguinal glands, depending upon the site of the inoculation.

Generalized Vaccinia is rare, but may manifest itself

as a pustular rash on different parts of the body, appearing on the eighth to the tenth day; the pustules are most abundant upon the vaccinated limb and may continue to appear for several weeks. The disease may prove fatal in children.

Complications of Vaccination.—Syphilis may follow if infected humanized lymph be used, and tetanus has been known to result from the employment of contaminated bovine virus. Erysipelas and septicæmia are possible complications, but proper antiseptic precautions will prevent their occurrence.

When a case of smallpox appears in the community, every person who has recently associated with the individual should immediately be vaccinated, no matter how short a time previously this has been done. It is also wise to vaccinate the patient, though this seldom results in any modification of the disease.

General Management.—The patient should be subjected to the strictest isolation, no one being allowed to approach him but his nurse and physician. It is best to procure a nurse who has had the disease, and if this is impossible, one who has recently been vaccinated successfully. The nurse and physician should wear caps of oiled silk or rubber, and linen or cotton gowns enveloping the whole figure, when in the sick-room. They should wear rubber gloves, and the physician rubber shoes, and these should be kept in the room and disinfected before being used again. Their visits to the patient should be as brief as possible. The room in which the patient is confined

should be emptied of all draperies and superfluous furniture, and should be thoroughly ventilated at all times. An apartment with a fire-place is best, for in addition to improving ventilation, this offers a place for burning all contaminated substances. All the patient's excreta should be disinfected in the manner described on page 79, and it is wise to suspend before the door a sheet wet with five per cent. phenol (carbolic acid) solution; just outside which disinfectants should be kept in which physician and nurse may wash their hands and faces after leaving the patient. All washable clothing both of nurse and patient should be soaked in a disinfecting solution for from six to ten hours before it is taken to the laundry, and then it should be thoroughly boiled. After the patient's recovery or death everything with which he has come in contact should be burned. If there is a disinfecting plant available, the mattresses and bedding may be disinfected by steam under pressure, but either this process or burning is absolutely necessary. When the quarantine is raised, which must not be done until the last scab has fallen, the patient and nurse should bathe in a 1 to 2000 mercury bichloride solution, carefully protecting the eyes; the hair should be shampooed, and clean clothing put on in another room.

If the patient dies, the body should be wrapped in a sheet wet with 1 to 2000 mercury bichloride solution, sealed in a metal coffin, and cremated or buried as soon as possible.

The apartment should be disinfected according to the usual methods and thoroughly aired.

Treatment.—The treatment of the disease is symptomatic. The patient's hair should be cut short, and the tendency to pitting may be lessened if strict attention is paid to cleanliness, and if the patient wears, to keep him from scratching, gloves and a gauze mask moistened with either a two per cent. phenol solution or a saturated one of boric acid. Frequent immersions in warm water or cleansing with hydrogen dioxide solution will aid in keeping the skin clean and free from pus. A thin ointment of ichthyol of ten per cent. strength is very soothing to the face.

The feeding and the nursing, on points other than those discussed above, should be conducted according to general principles.

Chicken-Pox.

Synonym.—Varicella.

Definition.—An acute, infectious, febrile disease of mild type characterized by a vesicular eruption.

Causation.—The disease is sporadic and occurs also at times in epidemics. It is essentially a disease of children and but very rarely is seen in the adult. It occurs in all climates and at all seasons. Its specific cause has not yet been discovered, but is probably a bacterium. It probably effects entrance to the body with the inspired air, and the contagium is given off from the patient. One attack usually, but not invariably, confers immunity.

The Eruption as a rule appears on the first day of the disease, first upon the face and scalp and later upon

the neck, body and limbs. The rash begins as a rounded red spot, which quickly becomes a papule and reaches the vesicular stage within a few hours. The vesicles vary in size from one-sixteenth to one-half an inch in diameter. Occasionally a few vesicles go on to the pustular form. There is no umbilication, and when pricked the vesicle collapses entirely, which is not the case in smallpox. The eruption lasts from two to five days, when the vesicles dry, form crusts, and soon fall; ordinarily leaving no scar. If the vesicles are scratched, however, they may leave cicatrices. The pustules may leave a slight depression which is almost never permanent. Successive crops appear, and we may see the eruption in all stages at the same time. The eruption may appear in the mouth and throat.

Course and Symptoms.—The incubation period is from ten to fifteen days; the period of invasion lasts one or two days, with slight fever and malaise. The onset is marked by chilly feelings (seldom by convulsions), moderate fever (100° to 102° F.—37.8° to 38.9° C.), general pains, nausea and prostration. The eruption appears within twenty-four hours, and the fever and other symptoms rarely last more than two or three days.

Complications are infrequent.

Prevention.—The patient should be isolated until the last crust has fallen; then the sick-room may be disinfected, though cleaning and airing are usually sufficient.

Treatment is usually unnecessary except in so far as cleanliness is concerned. The large vesicles may be opened and washed with boric acid solution; the itching may be relieved by the application of olive oil, which will also be found useful in loosening the crusts. It may be necessary to place mittens upon the patient's hands to prevent scratching. In any case the finger nails should be kept short and frequently cleansed with soap, water and a brush.

During the febrile stage fluid diet is to be preferred, but as soon as the temperature reaches normal, easily digested solids may be given.

Nursing should be conducted in accordance with general principles.

Measles.

Synonyms.—Rubeola; Morbilli.

Definition.—Measles is an acute, infectious fever characterized by congestion of the upper air passages and conjunctivæ and accompanied by an eruption of maculo-papular form.

Causation.—The disease is commonly endemic, epidemics appearing at intervals. It usually appears in children, but adults often contract it; it is most prevalent in the cold months. Its specific cause is a germ which has not yet been discovered. The infection is spread by contact, by the breath, by the secretions (especially those of the nose), by articles which have come in contact with sufferers from the disease, and through a third person. One attack usually, but by no

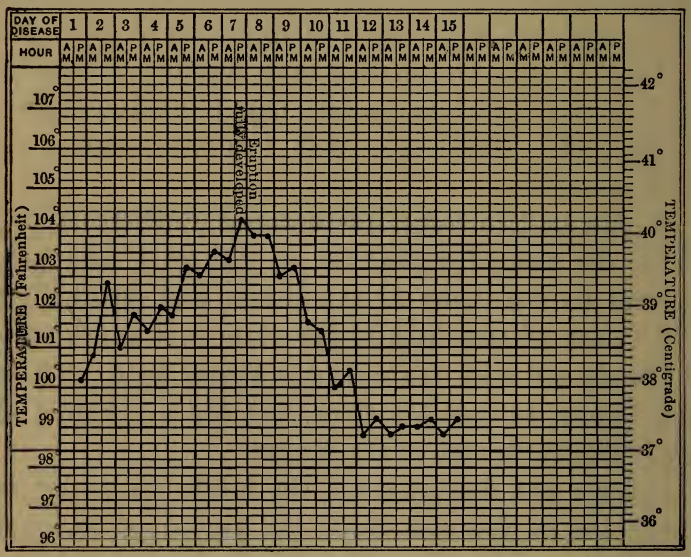
means always, confers immunity; several attacks in the same individual have been observed.

The Eruption appears about the fourth day; it is maculo-papular in form, and the spots, at first roundish, rose-colored, slightly elevated papules, tend to coalesce into a crescentic shape. The rash appears first on the face and mucous membrane, then upon the body, and last upon the extremities; it is fully developed in from two to four days, and then gradually fades. In from ten to fourteen days fine desquamation takes place. Rarely the rash may be vesicular or hæmorrhagic.

A day or two before the eruption small red spots, from the size of a pin-head to that of a split pea, appear on the lining of the cheeks and mouth. At the centre of each is a bluish-white spot which may be made out with the aid of a strong light. These are known as Koplik's spots, and are a certain and early diagnostic sign of the disease.

Course and Symptoms.—The incubation period is from ten to fourteen days; the period of invasion usually lasts four days. The disease is ushered in by chills or convulsions, followed by a rise in temperature to from 105° to 106° F. (40.5° to 41.1° C.), headache, prostration, rapid pulse, vomiting and commonly diarrhœa. There are usually conjunctivitis and rhinitis; the tongue is coated, and the glands of the neck may be swollen. During the height of the fever, stupor or delirium may be present. In from ten to fourteen days the eruption disappears, the fever subsides, and convalescence is established.

The Hæmorrhagic Type (*Black Measles*) may occur during epidemics in institutions where many children are congregated or among savage races attacked for the first time. The eruption is dark, and bleeding takes place into the skin and from the mucous membranes; the nervous symptoms are marked, the tem-


DAY OF DISEASE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
HOUR
A M P M
107° 106° 105° 104° 103° 102° 101° 100° 99° 98° 97° 96°
TEMPERATURE (Fahrenheit)
Eruption fully developed
42° 41° 40° 39° 38° 37° 36°
TEMPERATURE (Centigrade)

CLINICAL CHART OF MEASLES showing defervescence by lysis beginning when the eruption is fully developed.

perature high, and the prostration extreme. Gangrene of the face sometimes occurs as a complication. This form of the disease is very fatal.

Complications.—Convalescence may be interrupted by a continuance of the conjunctivitis, or by pharyngitis, inflammations of the ear or the lymph glands,

bronchitis, or, most important of all, broncho-pneumonia. Whooping-cough or diphtheria may be associated with the disease. The inflamed glands offer a fertile field for infection by the tubercle bacillus, and such an infection may be followed by acute miliary tuberculosis.

Prevention.—The measures to be taken to prevent the spread of the disease are the same as those applicable in scarlatina, but are less likely to be successful, for the contagium, although its life is shorter, seems to be much more easily diffusible. The patient should be isolated in an airy room, protected from draughts, and not allowed to associate with others until at least two weeks have elapsed since the onset. Many parents encourage their children to expose themselves, on the principle that every one must contract the disease, but this is little less than criminal.

All discharges, dressings, clothing, etc., should be disinfected according to the usual methods.

Treatment.—The patient should be kept in bed in a dark room while the temperature is elevated, and should be given at least one sponge bath with cool water daily. A disinfecting bath for both patient and nurse at the termination of the period of isolation is an essential. The eyes should receive careful attention; a few drops of a saturated solution of boric acid should be dropped into them every four hours, and the nose should be kept clean by means of an antiseptic such as the official antiseptic solution. During desquamation the skin should be anointed with cacao butter. The treatment in other respects consists in the combating of the symptoms as they arise.

The Diet during the febrile movement should be entirely fluid (milk, broths and the like), and the drinking of cool water is to be encouraged. As convalescence progresses a gradual return to solid diet is proper.

The nursing applicable to the other infectious exanthemata is equally suited to measles.

German Measles.

Synonyms.—Roseola; Rubella; Rötheln.

Definition.—An acute, infectious febrile disease, accompanied by a maculo-papular eruption and enlargement of the lymph-glands of the neck. Roseola resembles both measles and scarlet fever in its symptoms, but it is a distinct disease.

Causation.—This disease occurs most frequently in children, although it may be contracted by adults; it is most commonly observed during the cold months. Its specific cause has not been discovered, but the infection seems to be given off in the expired air and from the skin. Usually one attack affords protection against subsequent infection.

The Eruption appears upon the first or second day of the disease, first upon the forehead, and spreads quickly over the face, neck, trunk, and, finally, the extremities. It is in the form of round, pinkish points one-sixteenth to one-fourth of an inch in diameter, slightly elevated, and at first it disappears on pressure. The spots may be aggregated into blotches resembling the rash of measles, though they are less frequently

crescent-shaped, or into a diffuse redness resembling scarlet fever. The rash lasts from one to seven days, and may fade in one place before appearing in another. Occasionally some of the papules may turn into vesicles or pustules. Desquamation seldom takes place.

Course and Symptoms.—The incubation period is from one to three weeks; its average is about ten days. The invasion resembles that of measles, but is less severe; the appearance of the rash may be the first symptom. The onset is marked by chilly feelings, slight fever, headache, nausea, catarrhal inflammation of the mucous membrane lining the nose, throat and eyes, and swelling of the lymph-glands of the neck, rarely of those of the groins and axillæ. When the rash is fully developed the fever may reach 102° to 103° F. (38.9° to 39.5° C.), and all the symptoms are accentuated. After a few days the rash fades and the symptoms disappear.

Complications and relapses are rare.

Prevention.—The patient should be kept alone in a darkened room, if the eyes are affected, for ten days or two weeks, but the thorough disinfection necessary during and after measles and scarlet fever is not required.

Treatment is usually unnecessary, but the patient should be kept in bed if possible.

The Diet should be regulated in accordance with the patient's condition; the nursing may be conducted according to general rules.

The "Fourth Disease" of Dukes.

This is considered by Dukes to be an independent disease of mild character which simulates mild scarlatina, but differs from it in that its incubation period is much longer, being from nine to twenty-one days, and in its lack of prodromal symptoms. The eruption resembles that of scarlatina except that it begins upon the face; it is usually followed by profuse desquamation.

Many authorities doubt the existence of this as a separate disease, and it is certain that, before its identity can be established beyond question, further study must be made of German measles.

No especial consideration of the treatment or nursing of "Fourth Disease" is necessary.

Epidemic Cerebrospinal Meningitis.

Synonyms.—Cerebrospinal Fever; Spotted Fever; Malignant Purpuric Fever; Petechial Fever.

Definition.—An acute infectious fever appearing usually in epidemics and characterized by inflammation of the membranes of the brain and spinal cord and commonly by an eruption.

Causation.—The disease is most likely to appear in crowded localities amid unsanitary surroundings, and is most often seen in the cold months. Children are more prone to contract the infection than grown persons. The specific cause of this variety of meningitis is a bacillus which reaches the membranes of the brain and spinal cord through the nose or, having been

breathed into the lungs, finds access to the blood-stream and is carried by this medium. The contagion is probably not transmitted by the excreta or from one person to another.

Course and Symptoms.—The period of incubation is not certainly known. The onset is sudden and accompanied by a chill followed by fever, severe pain in the back of the head, projectile vomiting, soreness at the back of the neck, and inclination to bend the head backward. There are various symptoms referable to the eyes: dread of light, squint, falling of the upper lid, unequal pupils, and movements of the eye-ball from side to side. Sounds annoy the patient. There is often nose-bleed, and fever-sores upon the lips are frequent. Delirium soon appears.

The temperature curve shows great irregularity, being high at times, then dropping to normal only to rise suddenly again. The typical pulse is slow in comparison with the height of the fever, but some patients exhibit a rapid heart-action.

Small petechiæ or larger purpuric spots may appear upon the body, and there may be erythematous patches. During the disease there are likely to be convulsive movements of the extremities, and the legs are usually drawn up. The head is forced into the pillow, and the facial expression is typical (the *risus sardonicus*); the forehead is wrinkled and the teeth are exposed by the drawing outward of the corners of the mouth. Children are likely to make an outcry typical of the disease. It is a single, high, shrill cry, and when once heard is easily recognized.

The patient becomes rapidly emaciated and bed-sores are almost certain to ensue. The bowels are usually constipated, and in the late stages there may be inability to swallow; in which case food must be given through a tube passed into the stomach through the nostril or by means of the rectum. As the disease progresses the nervous irritability ceases, and the patient becomes stuporous or even comatose, while there is incontinence of urine and fæces.

In patients who recover the fever lasts several weeks and then gradually falls; as this takes place the symptoms slowly ameliorate. Relapses sometimes occur.

Convalescence is protracted.

Different varieties of the disease may occur as follows:

(*a*) *The Mild Type,* with dizziness, headache, stiffness of the neck, and low temperature.

(*b*) *The Intermittent Type,* in which the symptoms improve at intervals of a few days, but recur.

(*c*) *The Malignant Type,* in which hæmorrhages take place into the skin, the symptoms are intense, and death takes place within a few hours.

(*d*) *The Chronic Type,* which may last for several months with severe symptoms and marked emaciation.

Complications.—Pneumonia is the most common of these. Patients may recover with deafness or blindness and in children physical and mental development are frequently interfered with.

Treatment.—Isolation in a quiet, cool (about 65° F.—18.3° C.), darkened room is necessary. Gauze

should be employed in the place of handkerchiefs, and after being used, placed in paper bags and quickly burned. All discharges from the nose, throat and mouth should be disinfected. The head must be shorn and an ice-cap applied, and cold applications may be made to the spine. The delirium and convulsions should be controlled by sedatives and the temperature by cold sponging.

During convalescence the different tonics are indicated.

The Diet.—The nurse should do her utmost to maintain the nutrition of the patient by the frequent administration of nourishing foods in fluid or semi-fluid form. When swallowing has become impossible, feeding by the rectum must be employed, and if the patient is delirious he should be fed by nasal gavage (*see* page 157). During the stage of convalescence it is necessary that the patient should receive liberal feeding in order that he may regain his strength as rapidly as possible.

The nursing otherwise should be conducted along the usual lines.

CHAPTER IX.

THERMIC FEVER.

Heat Exhaustion: Insolation.

Synonyms.—Sun-stroke; Heat-stroke; Heat Prostration.

Definition.—A condition of prostration caused by exposure to intense heat.

Causation.—Thermic fever is most common in adult males, probably because of their greater liability to exposure and tendency to alcoholic habits. It also occurs frequently in infants. It is predisposed to by over-indulgence in exercise, food and alcohol. Soldiers on the march, stokers in the fire-rooms of steamships, and bakers and others whose occupations necessitate exposure to the sun or to extremes of artificial heat, are frequent sufferers.

Heat Exhaustion.

Course and Symptoms.—This affection is the result of continued exposure to high temperatures, especially when combined with muscular exertion, and is characterized by prostration, collapse, subnormal temperature (95° to 97° F.—35° to 36.1° C.), and small, quick pulse; the surface of the body is usually cool and in severe cases there may be delirium.

Insolation.

Course and Symptoms.—In the milder type of this affection the onset is marked by headache, dizziness, prostration, and possibly nausea and vomiting. Partial or complete loss of consciousness may follow. The skin is flushed, hot and dry, the temperature ranges from 104° to 112° F. (40° to 44° C.) or even higher, the pulse is rapid and full, the breathing may be difficult and stertorous, and the pupils are usually contracted. In the fatal cases the loss of consciousness becomes more profound, the heart weaker, the respiration rapid and shallow, and death may supervene within from twelve to thirty-six hours. In favorable cases a fall in temperature is accompanied by a remission of the other symptoms. Complete recovery may ensue, or the patient may be left with nervous and mental disturbances varying from simple loss of memory to insanity. A common sequel is inability to bear even slight degrees of heat; individuals with this idiosyncrasy have been known to become very uncomfortable at as low a temperature as 80° F. (26.7° C.).

In severe instances the patient may die suddenly, or within a short time, with all the symptoms of heart-failure, such as rapid, almost imperceptible pulse, extreme dyspnœa, and unconsciousness.

Prevention consists in the avoidance of extreme heat, abstinence from alcohol, over-eating, and overwork; plenty of water should be drunk, frequent baths are advisable, and the clothing should be light.

The Treatment of Heat Exhaustion consists in rest in a cool place and stimulation.

The Treatment of Thermic Fever consists in endeavors to lower the body temperature as rapidly as possible. If a bath-tub is available, the patient should be immersed in cool water and rubbed vigorously with lumps of ice, in the hands of at least two attendants. If no tub is at hand, the patient should be placed in the shade, and cool water dashed upon him. Syncope may be controlled by hypodermatic injections of alcohol, and such other stimulants as ether and ammonia may be given by the same means; artificial respiration may be necessary. If tubbing is impossible, ice water enemata may accomplish good results; sprinkle baths from a watering pot, held at a height, or from a hose, seem to have a good effect, probably from the stimulation caused by the impact of the water against the body.

The temperature should be taken at frequent intervals, and when it has reached 102° F. (38.9° C.) the hydriatic measures should be stopped, for otherwise the temperature is likely to fall to a subnormal level, and collapse may result. The patient should now be put to bed, given a cathartic, and catheterized if necessary; he should remain in bed and on a light diet for a few days. Subsequent rises of temperature may be controlled by cold sponging or tub baths, if necessary; otherwise no departure from the general principles of nursing in febrile conditions need be made.

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